The role impairment associated with common mental disorders among first-year university students in South Africa

by
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DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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SUMMARY

Rationale: Mental health statistics, such as the prevalence of CMDs and role impairment, are used to estimate the need for mental healthcare and are therefore central to the planning of services and interventions. Previous studies have determined the rates of 12-month CMDs among first-year students in South Africa, yet it is unclear what proportion of these students are severely impaired by their disorders.

Aims: The purpose with the study is to determine the need for mental healthcare among first-year university students in South Africa. The study has the following aims:

1. To determine the prevalence and severity of role impairment among first-year university students.
2. To determine if there are statistically significant differences in the prevalence of role impairment between students with and without 12-month CMDs.
3. To explore associations between severe role impairment and CMDs, when controlling for sociodemographic factors.
4. To identify which CMDs are the most impairing and prevalent in the population.

Methods: Web-based, self-report surveys were used to screen incoming first-year students at SUN and UCT (n = 1402) for DSM-IV mental disorders and health-related role impairment (Sheehan Disability Scale). Impairment was assessed in four domains: home management, university-related work, close relationships and social life.

Results: Findings showed that 42.7% of students had at least one 12-month CMD. Furthermore, 25.7% of students reported severe impairment in at least one domain of functioning (42.2% of students with at least one 12-month CMD vs. 13.3% of students without a 12-month CMD, $p < 0.01$). In total, 18% of students had 12-month CMDs and were severely impaired by their disorders. Multiple logistic regression showed that BP (aOR = 7.00; 95% CI = 1.70-28.91), DUD (aOR = 6.20; 95% CI = 2.77-13.88), and GAD (aOR =

5.60; 95% CI = 3.59-8.74) were associated with the highest odds of severe role impairment. However, when both role impairment and the prevalence of disorders were taken into account, ADHD, GAD and MDD were shown to account for the largest proportion of the need for care in the student population. Certain subgroups of students, such as sexual minority students, self-identified Black students, and older first-generation students, were more likely to report severe role impairment than their peers, independently of CMDs.

Conclusion: About a quarter of first-year university students in South Africa reported severe role impairment, and 12-month CMDs were strongly associated with severe role impairment. Mental health-related impairment has the potential to severely disrupt the development of young people, and contributes to academic failure. It is therefore critical that the South African government and institutions of higher education invest in student mental health.

OPSOMMING

Rasionaal: Statistieke oor geestesgesondheid, soos die voorkoms van CMD's en rolgestremdheid, is belangrike aanwysers van die behoefte aan geestesgesondheidsorg en is dus sentraal tot die toekenning van hulpbronne in die beplanning van dienste en intervensies. Vorige studies het getoon dat die persentasie van 12-maand CMD's onder eerstejaarstudente in SA hoog is, maar dit is onduidelik watter persentasie van hierdie studente ernstig benadeel word deur hul afwykings.

Doelstellings: Die doel van die studie is om die behoefte aan geestesgesondheidsorg by eerstejaarstudente in Suid-Afrika te bepaal. Die studie het die volgende doelstellings:

1. Om die voorkoms en erns van rolgestremdheid by eerstejaarstudente te bepaal.
2. Om vas te stel of daar statisties beduidende verskille is in die voorkoms van rolgestremdheid tussen studente met en sonder 12-maand CMD's.
3. Om assosiasies tussen ernstige rolgestremdheid en CMD's te ondersoek, terwyl assosiasies met sosiodemografiese faktore konstant gehou word.
4. Om vas te stel watter CMD's lei na die mees ernstige rolgestremdheid en kom mees algemeen in die bevolking voor.

Metodes: Webgebaseerde, selfrapporteringsopnames is gebruik om DSM-IV-geestesversteurings en gesondheidsverwante rolgestremdheid (Sheehan Disability Scale) te ondersoek onder inkomende eerstejaarstudente aan SUN en UCT (n = 1402), wat 'n deelnamekoers van 10.8% gelewer het. Rolgestremdheid is in vier domeine beoordeel: huisbestuur, universiteitsverwante werk, hegte verhoudings en sosiale lewe.

Resultate: Bevindinge het getoon dat 42.7% van studente minstens een 12-maand CMD gehad het. Verder het 25.7% van studente ernstige verswakking in ten minste een funksioneringsgebied aangedui (13.3% van studente sonder 'n geestesversteuring, teenoor 42.2% van studente met minstens een 12-maandelikse CMD, $p<0.01$). Veelvuldige logistieke

regressie analise het getoon dat BP (aOR = 7.00; 95% GI = 1.70-28.91), DUD (aOR = 6.20; 95% GI = 2.77-13.88) en GAD (aOR = 5.60; 95% GI = 3.59-8.74) assosieer word met die grootste kans op ernstige rolgestremdheid. Wanneer die voorkoms van CMDs in ag geneem is, is daar egter getoon dat ADHD, GAD en MDD die grootste deel van die behoefte aan sorg in die studentepopulasie uitmaak. Bevindinge het verder getoon dat sekere subgroepe, soos seksuele minderhede, self-geïdentifiseerde Swart studente, en ouer eerste-generasie studente, ‘n groter kans op ernstige rolgestremdheid as hul eweknieë het, ongeag CMD's.

Gevolgtrekking: Die persentasie eerstejaarstudente in Suid-Afrika wat ernstige rolgestremdhede rapporteer was hoog, en 12-maandelikse CMD's het sterk verband gehou met ernstige rolgestremdheid. Probleme met geestesgesondheid kan die ontwikkeling van jongmense ernstig ontwrig, en dra ondermeer by tot akademiese mislukking. Dit is dus van kritieke belang dat die Suid-Afrikaanse regering en instellings vir hoër onderwys intervensies ondersteun wat gerig is op geestesversteurings en gepaardgaande rolgestremdhede.

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LIST OF ABBREVIATIONS

WHO WMH-ICS. World Health Organisation World Mental Health International College Student Initiative.

SDS. Sheehan Disability Scale.

CMD. Common mental disorder.

MDD. Major depressive disorder.

GAD. Generalised anxiety disorder.

BP. Bipolar spectrum disorder.

AUD. Alcohol use disorder.

DUD. Drug use disorder.

ADHD. Attention deficit hyperactivity disorder.

Chapter 1: Introduction

The university population is an important target for mental health research and interventions, seeing that common mental disorders (CMDs) in this population are severely impairing and highly prevalent. About a third of students typically suffer from a CMD (Auerbach et al., 2018), and CMDs are associated with high levels of impairment in social, academic and other areas of functioning (Alonso et al., 2018; Verger, Guagliardo, Gilbert, Rouillon and Kovess-Masfety, 2010). Mental health statistics, such as the prevalence of CMDs and role impairment, are used to assess the need for mental healthcare and therefore to make resource allocation and targeting decisions in the planning of services and interventions (Kessler and Üstün, 2004). Previous studies have shown that almost a third of students in South Africa (31.5%) have 12-month CMDs (Bantjes et al., 2019), yet it is unclear what proportion of these students are severely impaired by their disorders. In this study, only students with 12-month CMDs who are severely impaired by their disorders are deemed to be in need of mental healthcare. Furthermore, subgroups of students who have increased odds of severe role impairment independently of CMDs are identified as potential targets for special interventions that focus on improving functioning. The aim with the study is thus to analyse the associations between severe role impairment and CMDs, and the associations between severe role impairment and selected sociodemographic factors. The study forms part of the World Health Organisation World Mental Health International College Student Initiative (WHO WMH-ICS), which is the largest psychiatric survey of its kind ever undertaken. The initiative is aimed at gathering more information about CMDs among university students in order to develop and plan effective online interventions (Cuijpers et al., 2019a).

Definition of key terms

The focus of this dissertation is on the associations between severe role impairment and CMDs, and the associations between severe role impairment and selected sociodemographic variables. Below, I define the relevant constructs as they are used in this research.

Mental health statistics and the need for mental healthcare

In this study, the need for mental healthcare is determined by looking at the prevalence of 12-month CMDs and associated role impairment during the past year. It is assumed that only students who have 12-month CMDs and are severely impaired by their disorders need mental healthcare. This decision is based on the clinical significance criterion described in the Diagnostic and Statistical Manual of Mental Disorders (DSM) (American Psychiatric Association, 2013), as discussed in greater detail below.

Role impairment

The term "role impairment" is related to a number of terms that are used to describe disability. In this study, role impairment is used to describe psychiatric disability. In psychiatric research, role impairment literally means to be impaired in a certain life role, such as your academic work as a student, or your social life (Kessler & Üstün, 2004).

The general public have a different understanding of disability from researchers and policy-makers. For instance, the online Cambridge Dictionary (2020) gives a straightforward definition of disability as "an illness, injury, or condition that makes it difficult for someone to do the things that other people do". This definition suggests that disabled people are unable to do what they would normally do as a direct consequence of their health conditions. Among researchers and policy-makers, on the other hand, disability is understood as an interaction between the health conditions that people have, and their physical, social and political

environments (World Health Organisation, 2020a). This definition of disability is operationalised for measurement in the International Classification of Functioning, Disability and Health (ICF), which is the standardised disability compendium of the international diagnostic system in medicine, the WHO's International Statistical Classification of Diseases and Related Health Problems (ICD)[1] (Üstün, Chatterji, Bickenbach, Kostanjsek, & Schneider, 2003). The definition of disability developed in the ICF is designed as a generic definition which can be used with any medical condition, including CMDs (WHO, 2002).

The problem with generic definitions and measures of disability is that people with psychiatric disabilities and people with non-psychiatric disabilities differ in fundamental ways. Generally, people with non-psychiatric disabilities are chiefly concerned with problems of mobility and physical access to the environment, whereas people with psychiatric disabilities are more concerned about social and work-related functioning (Thara, 2005). For this reason, specialised definitions and measures have been developed to describe psychiatric disability. The "role impairment" construct used in the present study is derived from the DSM, wherein the American Psychiatric Association (APA) (2013) describe disability in relation to the clinical significance criterion, which requires that mental disorders cause "clinically significant distress or impairment in social, occupational, or other important areas of functioning" before a diagnosis can be made (American Psychiatric Association, 2013, p. 21). The WHO World Mental Health (WMH) Surveys, the largest cross-national psychiatric survey initiative ever undertaken, used instruments such as the Sheehan Disability Scale (SDS) (Sheehan, 1983; Sheehan et al., 1996) to measure the disability construct described in the DSM, calling it "role impairment" (Cuijpers et al., 2019b; Kessler & Üstün, 2004). In the WMH Surveys, the WMH-ICS, and therefore also in this study, the SDS is used to measure role impairment in four domains: home management, university-related work,

[1] See pp. 54-56 for more details.

close relationships and social life. The SDS is a self-rated measure of health-related impairment that does not measure interactions between CMDs and the environment. It is nevertheless important that the foundational understanding of disability as an interaction between health conditions and the environment, as described in the ICF, be kept in mind when interpreting any findings pertaining to disability, including the findings of this study.

Common mental disorders

In the present study, the term "common mental disorder" is literally used to refer to DSM-IV mental disorders that are common among university students. This is consistent with the way the term is defined in other WMH-ICS studies (Alonso et al., 2018; Alonso et al., 2019; Auerbach et al., 2018; Bantjes et al., 2019). The CMDs included in this study included MDD, GAD, BP, AUD, DUD and ADHD.

The definition of CMDs used in this study contrasts with some of the other definitions that have been used in the literature. For instance, according to Almeida et al. (2007), CMDs are "usually characterized as disorders that, although initially requiring no psychiatric treatment, later prove to have great socioeconomic impact" (p. 246). Almeida et al. go on to describe CMDs as being characteristically associated with milder symptoms, like "insomnia" and "fatigue", as opposed to chemical dependence or psychotic symptoms. In other words, CMDs are not full disorders, like clinically diagnosed MDD or GAD, but are something in the region of subthreshold disorders that do not require immediate intervention. The definition of CMDs used in the WMH-ICS, and also in the present study, contrasts sharply with other definitions of the term that have been used in the literature, such as the definition by Almeida et al. above, and should not be confused with these definitions.

Theoretical framework

This is an epidemiological study conducted with the paradigm of evidence-based public mental health. Public mental health initiatives apply the framework of public health in the mental health sector. One of the chief differences between public health initiatives, and public and private health services, is that they focus on the health of entire populations, as opposed to the health conditions of individual patients (CDC Foundation, 2020). Public health initiatives also focus more on the prevention of health conditions than the treatment thereof (CDC Foundation, 2020).

Public health initiatives are usually led by governmental departments, with cooperation from private and voluntary individuals and organisations (Institute of Medicine, 1988, p.42). The WHO plays a central role in coordinating the different public health initiatives on an international scale (Ruger & Yach, 2009). The WHO defines health as a "state of complete physical, mental and social well-being" (World Health Organisation, 2020b). It follows that both physical and mental health form part of the WHO's public health undertaking.

The two central pillars of public health are surveillance and intervention. Surveillance programmes, such as the WMH-ICS, are used to gather health data about the population, such as the prevalence of CMDs and disabilities, and associated risk and protective factors that increase or decrease the odds of the observed health outcomes. This information is then used to design interventions to control and prevent health conditions on a population level (Wallace, 2008), something that is also planned in the WMH-ICS as a comprehensive public mental health initiative (Cuijpers et al., 2019a).

Epidemiology is central to evidence-based practices in public mental health, which requires that the best available evidence be used in decision-making (Ben-Shlomo, Brookes, & Hickman, 2013). Wallace (2008) defines epidemiology as a scientific process that is used to detect, investigate and analyse health problems. As a scientific method, epidemiology is

grounded in positivism, which requires that knowledge is based on sensory observations and objective measurements that can be empirically verified (American Psychological Association, 2020). Furthermore, epidemiology is a quantitative methodology within science that relies heavily on numbers and statistical tools to study phenomena, as opposed to qualitative methodologies that use linguistic tools (Wilson & Joye, 2020).

One important function of epidemiology in public mental health is to determine the need for care (Wallace, 2008). There are three important reasons why severe role impairment should be read alongside the prevalence of CMDs to determine the need for care. First, the APA, particularly since the DSM-IV, uses role impairment to help determine whether or not psychological syndromes are clinically significant (Kessler & Üstün, 2004). The clinical significance criterion aids clinicians and researchers in distinguishing between CMDs, and cases in which disturbances are to be considered "normal" and require no intervention (American Psychiatric Association, 2013, p. 21). Previous studies have found that the majority of students with 12-month CMDs are not severely impaired by their disorders (see, for instance, Alonso et al., 2018; Alonso et al., 2019; Verger, Guagliardo, Gilbert, Rouillon, & Kovess-Masfety, 2010). This reflects the fact that some students with 12-month CMDs have already accessed treatment, or use effective coping strategies. It is therefore important to exclude these students from estimates of the need for care by focusing on students with 12-month CMDs who are severely impaired by their disorders. Second, role impairment is a more comprehensive measure of the need for care than the prevalence of CMDs alone. This is part of the reason why research studies characteristically detect a considerable proportion of students who report severe role impairment, but do not screen positive for 12-month CMDs. It is important to take account of these students in estimates of the need for care, as some of them may have disorders that were not included in the survey, which require treatment due to the impairment caused. Finally, according to Carlton (2015), there is an

increasing number of programs to support underrepresented populations on university campuses, such as first-generation students and sexual minority students. Therefore, groups of students who have increased odds of severe role impairment independently of CMDs are identified in this study as potential targets for special interventions that focus on improving functioning.

Mental healthcare in South African universities

Education plays a central role in the development of young people. The South African population is young, with more than half (32.3 million) below the age of 30 (Statistics South Africa, 2019a). The youth are most affected by unemployment, with the national level of unemployment being 29.1% (Statistics South Africa, 2019c). More than half (55.9%) of unemployed persons do not have matric, and about a third (34.7%) have matric only, compared to only 1.9% who are graduates, and 6.8% who have another tertiary qualification (Statistics South Africa, 2019c). In the aftermath of apartheid, there are also large variations in unemployment across population groups, with previously disadvantaged groups being most affected by unemployment (Statistics South Africa, 2019c). Many developing countries, including South Africa, invest in education to fight joblessness and inequality. The numbers of previously disadvantaged students in higher education in South Africa are now representative of the general population of the country, which indicates remarkable improvement since 1994 (Council on Higher Education, 1999; Council on Higher Education, 2019). However, the total enrolment rate at institutions of higher education has remained constant as a proportion of the population, which indicates that access to higher education has not improved overall. Furthermore, there are high rates of student attrition at institutions of higher education. For instance, 42% of students enrolled in 3-year degrees in 2012 dropped out by 2017, and 35% of students enrolled in 4-year degrees dropped out in the same time

period (Council on Higher Education, 2019). Therefore, apart from improving access to higher education, it is important to improve student outcomes.

Investment in the mental health of students may improve student outcomes. The university years typically coincide with the critical transition from adolescence to emerging adulthood, during which the rates of 12-month CMDs reach their highest levels during the lifetime (Mowbray et al., 2006). It has been shown that 12-month CMDs are strong predictors of impairment in academic achievement, including low academic self-efficacy, delayed study progress, academic failure and attrition (Bruffaerts et al., 2018; Eisenberg, Golberstein, Hunt, et al., 2009; Grotan, Sund, & Bjerkeset, 2019; Heiligenstein, Guenther, Hsu, & Herman, 1996; Holmes & Silvestri, 2015; Hysenbegasi, Hass, & Rowland, 2005; Keyes et al., 2012a). Moreover, the risk of CMDs is higher among previously disadvantaged students, including first generation students[2] (Covarrubias, Romero, & Trivelli, 2015; McFadden, 2016; Stebleton, Soria, & Huesman, 2014), female students (Auerbach et al., 2018; Bantjes et al., 2019), sexual minority students (Auerbach et al., 2018; Bantjes et al., 2019; Kerr, Santurri, & Peters, 2013), and students with disabilities (Coduti, Hayes, Locke, & Youn, 2016). Student mental health is therefore relevant to fighting inequality, in addition to addressing the high rates of student attrition.

It is in the interest of both the South African government and institutions of higher education to invest in initiatives such as the WMH-ICS that develop effective ways to improve student mental health. Online mental health interventions, such as those proposed in the WMH-ICS, have been shown to be effective in improving the social and academic functioning of students, in addition to treating the symptoms of CMDs (Conley, Durlak, Shapiro, Kirsch, & Zahniser, 2016; Davies, Morriss, & Glazebrook, 2014; Harrer et al., 2019). An investment in student mental health would improve the government's return on

[2] Defined as students who are part of the first generation of their family to go to university.

student subsidies because students would be more likely to complete their studies. This would improve the national trajectory of poverty, joblessness and inequality in the country, which to a large degree is driven by a lack of education. Universities would also benefit from investing in the mental health of students, as it would improve student retention and therefore revenue flows. Furthermore, Dr Dana Farnsworth, a former Harvard psychiatrist, made the argument that good mental health is “a keystone in the structure of education” that enables students “to take the greatest possible advantage of the academic, extracurricular, and environmental offerings of the university” (quoted in Barreira & Snider, 2010, p. 27). It can therefore be argued that the criteria that define a good education, and therefore a good university, includes the promotion of good student mental health.

The need for mental healthcare in the university population: rationale for the study

The need for mental healthcare in the university population is determined by the prevalence of 12-month CMDs and associated role impairment. These statistics are therefore essential in the planning of services and interventions such as those proposed in the WMH-ICS. In the next two sections, the prevalence of CMDs and role impairment in the university population are discussed, and the research gap that the study fills is identified.

The prevalence of CMDs in the university population

The highest rates of 12-month CMDs are found between the ages of 15-24 years (Kessler et al., 1994), which coincides with the university years. There are various isolated studies available that report on the prevalence of CMDs in university settings. Most of these studies found high rates of mental health problems among students. For instance, in a survey of college students that was conducted by the American College Health Association (2008) in the USA, only "back pain", "allergy problems" and "sinus infection" were reported more

frequently than "depression", and "anxiety disorder" was the sixth most common complaint after "strep throat" (p. 205). Furthermore, nearly one in ten students "seriously considered attempting suicide" at least once in the past year (American College Health Association, 2008, p. 205). In a large web-based survey of students from a university in the USA (n = 2 843), 15.6% of undergraduates screened positive for current depression and anxiety disorders, and 7.9% reported non-suicidal self-harm over the past 4 weeks, which included cutting and interfering with wound healing (Eisenberg, Gollust, Golberstein and Hefner, 2007). A study of students from two large Australian universities found high rates (19.2%) of psychological distress indicative of severe mood and anxiety disorders (Stallman, 2010). In a sample of students from a university in Spain (n = 554), 8.7% screened positive for a current major depressive episode (Vázquez & Blanco, 2008).

As opposed to these isolated studies, the WMH-ICS initiative makes it easier to form a global picture of CMDs in universities. A consistent methodology was used to assess a far more comprehensive range of CMDs than were assessed in any single study above, in multiple countries, and in different universities in those countries. Auerbach et al. (2018) found that it is typical for one-third of students to report 12-month CMDs, ranging from 19.1% in Belgium to 43.3% in Australia. Furthermore, the vast majority (89.0%) of first-year students with lifetime disorders presented with 12-month prevalence (Auerbach et al., 2018), which indicates that most students who have had CMDs in their lifetime are actively struggling with their disorders. The latest results for UCT and SUN, two large universities in the Western Cape, South Africa, indicated that 38.5% of students had lifetime CMDs, and 31.5% had 12-month CMDs, which amounts to 81.8% of lifetime cases being active in the past 12-months (Bantjes et al., 2019). Internationally, the most common disorders, both in terms of lifetime and 12-month prevalence, were MDD (21.2% lifetime prevalence; 18.5% 12-month prevalence), GAD (18.6% lifetime prevalence; 16.7% 12-month prevalence) and

AUD (6.8% lifetime prevalence; 6.3% 12-month prevalence)[3] (Auerbach et al., 2018). In the South African sample, the ranking of lifetime prevalence was identical: MDD was the most prevalent disorder (24.7%), followed by GAD (22.6%) and AUD (6.1%). However, the ranking of 12-month prevalence was different: GAD was the most common disorder (20.8%), followed by MDD (13.6%) and AUD (5.6%) (Bantjes et al., 2019). This difference in the ranking of 12-month disorders is due to GAD being slightly more prevalent in the South African sample than internationally, while the 12-month prevalence of MDD was significantly lower.

Role impairment in the university population

The evidence shows that CMDs are associated with high levels of academic impairment. For instance, in a large survey of higher education students conducted by the American College Health Association (2008), 44% of students reported that at least on one occasion in the past 12 months, they felt "so depressed it was difficult to function" (p. 205). Furthermore, "stress", "sleep difficulties", and "depression, anxiety and seasonal affective disorder" emerged among the top five impediments to academic performance, with "relationship difficulty" listed sixth, "internet use/computer games" listed seventh, and "alcohol use" listed tenth (American College Health Association, 2008, p. 198). Similarly, in a large sample of students from a university in the USA (n = 2 843), 18.4% of undergraduates reported that they missed academic obligations in the past four weeks due to mental health issues, and 44.3% reported that mental health issues had affected their academic performance in the past four weeks (Eisenberg et al., 2007). Various other studies have found that CMDs are

[3] Anxiety, mood and substance use disorders are also the most prevalent disorders in the general population both internationally (Kessler et al., 2009) and in South Africa (Herman et al., 2009).

associated with lower academic self-efficacy and delayed study progress, lower grade point averages, as well as academic failure (Bruffaerts et al., 2018; Cuijpers et al., 2019b; Eisenberg, Golberstein, Hunt, et al., 2009; Fauman and Hopkinson, 2010; Grotan, Sund, & Bjerkeset, 2019; Heiligenstein, Guenther, Hsu, & Herman, 1996; Holmes & Silvestri, 2015; Hysenbegasi, Hass, & Rowland, 2005; Keyes et al., 2012a).

Common mental disorders are not only associated with academic impairment, but can also cause impairments in other areas of functioning, such as in social relationships and in one's ability to fulfil the practical roles in managing a household. Nevertheless, a literature search reveals that our knowledge of role impairment in the university years is sparse, and most of this knowledge is focused on academic impairment. Furthermore, the minority of studies that examined a broader range of impairment than academic impairment focused on particular disorders, such as ADHD (Blase et al., 2009; Buchanan, 2011; Sacchetti & Lefler, 2017; Shaw-Zirt, Popali-Lehane, Chaplin, & Bergman, 2005; Weyandt et al., 2013), and to a lesser degree depression (Eisenberg et al., 2013; Klemenc-Ketis, Kersnik, Eder & Colarič, 2011). This supports Alonso et al.'s (2018) assertion that the patterns of role impairment among university students remain poorly understood.

The WMH-ICS marks the first attempt to study the role impairment associated with a wide range of CMDs in university students internationally, using standardised methods. The SDS was used to measure role impairment in four domains: home management, university-related work, close relationships and social life (Sheehan, 1983; Sheehan et al., 1996). Three studies that report on role impairment have been published as part of the WMH-ICS initiative. The first two of these studies reported the international results of the WMH-ICS, using a combined sample of all the countries involved (Alonso et al., 2018; Alonso et al., 2019). The other study investigated role impairment in the Spanish sample alone (Ballester et al., 2020). Alonso et al. (2018) found high levels of role impairment in the international

sample, with 42.9% of students with 12-month CMDs reporting severe role impairment in at least one of the domains that were assessed, compared to only 10% of students without these disorders ($p < 0.01$). The 12-month disorders that were associated with the highest odds of severe role impairment were MDD (aOR = 4.0; 95% CI = 3.3, 4.8), GAD (aOR = 3.9; 95% CI = 3.1, 4.8), and PD (aOR = 2.9; 95% CI 2.4, 4.2). Adjusting for CMDs, Alonso et al. (2018) and Alonso et al. (2019) also analysed associations between selected sociodemographic variables and severe role impairment, when controlling for CMDs. They found significant differences in the levels of impairment that students reported based on gender and sexual orientation.

In order to plan mental health interventions for university students, we need to assess the need for care, and therefore the patterns of mental health-related role impairment in the populations that the interventions are designed for. This is the first study to investigate role impairment among South African university students, using large samples and standardised methods. The information generated in this study can be used in the planning of interventions to prevent and/or alleviate adverse mental health-related outcomes in the South African university population.

Research aims

The purpose with the study is to determine the need for mental healthcare among first-year university students in South Africa. The study has four aims:

1. To determine the prevalence and severity of role impairment among first-year university students.
2. To determine if there are statistically significant differences in the prevalence of role impairment between students with and without 12-month CMDs.

3. To explore associations between severe role impairment and CMDs, when controlling for sociodemographic factors.
4. To identify which CMDs are the most impairing and prevalent in the population.

Outline of the thesis:

The literature review, methodology and results of the study will be presented and discussed in the next chapters, and conclusions will be drawn based on the study findings. The format of the dissertation is as follows:

Chapter 2. Literature review.

Chapter 3: Methodology.

Chapter 4. Results.

Chapter 5. Discussion.

Chapter 6. Conclusion.

Conclusion

In this chapter, I have discussed the rationale and key concepts of the study. In the next chapter, I will review the literature on CMDs and role impairment in the university context.

Chapter 2: Literature review

In this chapter, I will review the role impairment literature for the university years. First, I will sketch a picture of the developmental context within which the lives of most first-year students take place, and explain how CMDs and severe role impairment fit into this picture. I will then aim to answer the following questions: 1) what is known about the associations between role impairment and CMDs among university students? and 2) what is known about the associations between role impairment and selected sociodemographic factors among university students? Finally, I will give an overview of the instruments that are used to measure role impairment in the research literature in order to provide a rationale for the way role impairment was measured in this study.

Role impairment during the transition to university and emerging adulthood

The transition from school to university is an important milestone in the lives of first-year students that typically coincides with the transition from adolescence to emerging adulthood (Conley, Kirsch, Dickson, & Bryant, 2014). The transition to university normally goes along with leaving the family home for a new and unfamiliar environment. This poses many challenges as well as opportunities, such as changing roles, decreased parental oversight, distance from the support network of the family, large changes in social relationships, and increased responsibility for self-management in everything from mental and physical health to studies (Cleary, Walter, & Jackson, 2011; Conley, Kirsch, Dickson, & Bryant, 2014). While the stresses, disruptions and challenges of the transition to university are conducive to growth, it may also precipitate or exacerbate mental illness (Cleary et al., 2011). Some risk factors for ill mental health at university include academic stress, poor sleeping patterns, poor diet, and increased opportunities for alcohol and substance misuse (Cleary et al., 2011).

Stresses and risk factors such as those experienced at university, and during emerging adulthood more generally, must play at least some role in the fact that the highest rates of past year CMDs are found in the age category 15-21 years (Mowbray et al., 2006). However, there are also biological processes behind this phenomenon. It has recently been discovered that the brain does not stop developing during adolescence, but continues to develop during the twenties (Kay, 2010). It was found that brain maturation occurs last in the prefrontal cortex, the brain region that is responsible for executive functions such as attention, abstract reasoning, judgment, self-awareness, and self-control (Kay, 2010). According to Siggins (2010), the newly discovered brain changes may be involved in continuing psychosocial development during the university years, including the consolidation of personal identity. However, the ongoing maturation of the young adult brain may also play a role in risk behaviours such as alcohol and drug abuse, as well as the high prevalence of CMDs (Kay, 2010). Specifically, emerging adults may have a harder time managing the myriad stresses of life compared to older adults because of their underdeveloped executive processes. This also makes young people more prone to risk behaviours such as alcohol abuse (Brown et al., 2008; Cservenka and Brumback, 2017) and substance abuse (England et al., 2017; Meier et al. 2012), which are often used to manage stress and regulate emotions, and which may further interfere with executive functioning and self-regulation (Crean, Crane, & Mason, 2011; Fernández-Serrano, Pérez-García, Schmidt Río-Valle, & Verdejo-García, 2010; Le Berre, Fama, & Sullivan, 2017; Salmani, pilehroud, & jammali, 2020). Furthermore, the developing adolescent brain is particularly sensitive to damage from substances of abuse, including alcohol, marijuana and nicotine, which are potentially neurotoxic, and can cause enduring problems if they are abused, including neurocognitive deficits in learning, memory, abstract thought and language, which lead to academic, social and other kinds of impairment (Cunha-Oliveira, Rego, & Oliveira, 2008; England et al., 2017; Majewska, 1996; Meier et al.,

2012; Thompson et al., 2004; Williams et al., 2007; Zeigler et al., 2005). Alcohol and substance abuse are also often comorbid with other CMDs. Longitudinal studies that are capable of determining the order of onset of these disorders have found causal links running both ways, with CMDs playing a role in causing alcohol and drug use disorders, and alcohol and drug use disorders playing a role in causing other CMDs (see for example Fergusson, Boden, & Horwood, 2011; and Swendsen et al., 2010).

Common mental disorders, including substance use disorders, cause devastating levels of impairment among youth. Globally, CMDs account for a quarter of all Years Lived with Disability (YLDs) in youth 24 and under, making it the leading cause of YLDs in this age group[4] (Erskine et al., 2015). Mental and substance use disorders are also the 6th highest contributor to Disability Adjusted Life Years (DALYs) in youth 24 and under, being the leading cause in high-income countries and the 7th leading cause in low-and middle-income countries[5] (Erskine et al., 2015). Common mental disorders do not only impact the immediate functional status of young people, but also more broadly impact their long-term developmental trajectory and adjustment to society. Early-onset CMDs are associated with various undesirable outcomes in adult life, such as lower educational achievement, lower household income, and an increased risk of unemployment and being unmarried (Fergusson & Woodward, 2002; Jayakody, Danziger, & Kessler, 1998; Kawakami et al., 2012; Kessler et al., 2009). For many, these long-term trends of impairment and thwarted development start in the university years.

Role impairment in the university population

As Alonso et al. (2018) rightly observe, our formal knowledge of the patterns of role

[4] In the Global Burden of Disease Study (GBD), YLDs and DALYs are summary measures of population health that are used to measure the fatal and non-fatal outcomes of disease. See pp. 51-52 for more information.
[5] This discrepancy between the DALYs of HICs and LMICs is due to the much higher levels of mortality attributable to infectious diseases in LMICs (Erskine et al., 2015).

impairment is limited, particularly so our knowledge of role impairment among university students. Below, I will examine the available literature on role impairment during the university years. In the first section, I will discuss a number of isolated studies of role impairment that were done independently of the WMH-ICS. This is followed by a discussion of the role impairment studies that form part of the WMH-ICS initiative.

Studies of role impairment that are independent of the WMH-ICS

Most studies of role impairment in the university years have focused on academic impairment. Common mental disorders have a significant effect on academic performance, such as lower academic self-efficacy and delayed study progress, lower grade point averages, as well as academic failure (American College Health Association, 2008; Bruffaerts et al., 2018; Cuijpers et al., 2019b; Eisenberg et al., 2007; Eisenberg, Golberstein, Hunt, et al., 2009; Fauman and Hopkinson, 2010; Grotan, Sund, & Bjerkeset, 2019; Heiligenstein, Guenther, Hsu, & Herman, 1996; Holmes & Silvestri, 2015; Hysenbegasi, Hass, & Rowland, 2005; Keyes et al., 2012a). Common mental disorders are also strongly associated with other kinds of impairment, such as impairments in home chores and social relationships, but less is known about these other kinds of mental-health related impairments.

There are a number of isolated studies that have looked at a broader range of role impairment in university students. These studies are mostly limited to individual disorders, notably ADHD and depression. Students with ADHD were generally found to have more problems with adjusting to the university environment than their peers, including in their social lives (see, for instance: Blase et al., 2009; Buchanan, 2011; Sacchetti & Lefler, 2017; Shaw-Zirt, Popali-Lehane, Chaplin, & Bergman, 2005; Weyandt et al., 2013). In a study of depression among Serbian students, significant, negative associations were found between scores on the Beck Depression Inventory (BDI) and all of the outcome domains that were

assessed using the Medical Outcome Study Short Form Survey (SF-36) (Klemenc-Ketis, Kersnik, Eder and Colarič, 2011). A higher depression score was significantly associated with role limitations due to physical health problems (including work and other activities), role limitations due to emotional health problems (also including work and other activities), and impairments in social functioning. Interestingly, although the authors did not study alcohol or drug use disorders, they also found that smokers had significantly lower scores on the SF-36, indicating lower levels of wellbeing and functioning compared to their non-smoking peers. Furthermore, they found that drinkers had lower scores on the SF-36 than non-drinkers, indicating lower levels of wellbeing and functioning. It seems that there was a dose-response relationship, where more frequent drinking led to lower levels of well-being and functioning among drinkers (Klemenc-Ketis, Kersnik, Eder and Colarič). The results for associations between alcohol use and impairment were not statistically significant in this study, but it is worth mentioning as it will become clear that the associations between AUDs and role impairment are commonly insignificant in smaller samples of university students. In another study, known as the Healthy Minds study (n = 14 175), a national sample of US college students were asked how difficult their depressive symptoms made it to do their work, to manage things at home, and to get along with other people. Of those students who screened positive for depression, 48.6% reported that they found the associated problems "somewhat difficult", 7.4% reported that they found these problems "very difficult", and 1.9% reported that they found the problems "extremely difficult" (Eisenberg et al., 2013, p. 63).

The studies above are able to confirm that particular CMDs are associated with severe role impairment, but they don't compare a large number of disorders and can therefore not be used to make comprehensive estimates of the need for mental healthcare. It is very rare for studies to examine the role impairment associated with a number of CMDs among university

students so as to form a general picture of mental health-related impairment in that population. In one such study of university students from south-eastern France (n = 1 723), Verger, Guagliardo, Gilbert, Rouillon and Kovess-Masfety (2010) used the Sheehan Disability Scale to study the role impairment associated with various CMDs in the areas of "work/study", "close relationships" and "social life". "Severe role impairment" was defined as a self-rated impairment score of at least 7 out of 10 in any category of functioning. They found that 51.7% of students with 12-month CMDs, as opposed to 7.7% of students without 12-month CMDs, reported severe role impairment. The strongest associations with severe role impairment were found for social phobia, and comorbid major depressive and anxiety disorders. Alcohol and drug use disorders had the weakest associations with severe role impairment, and for most of the domains of functioning, the results for these disorders were not significant. Anxiety disorders (15.7%) and MDD (8.9%) were the most prevalent 12-month disorders, in addition to being strongly associated with severe role impairment (Verger et al., 2010). Therefore, anxiety disorders and MDD accounted for the largest proportion of the need for care in this population.

Studies of role impairment in the WMH-ICS

New knowledge about the role impairment associated with CMDs among university students is emerging from the WMH-ICS, representing the most sophisticated data on this subject to date. So far, only three studies on role impairment have been published as part of the initiative. The first two of these studies reported the international results, using a combined sample of all the countries involved (Alonso et al., 2018; Alonso et al., 2019). The most recent study investigated role impairment specifically in the Spanish sample (Ballester et al., 2020). With the WMH-ICS, it is becoming possible to make comprehensive estimates of the need for mental healthcare in the university population. It is also becoming possible to

make international comparisons of the role impairment associated with various CMDs. Like the French study discussed at the end of the previous section (Verger et al., 2010), the Sheehan Disability Scale (Sheehan, 1983; Sheehan et al., 1996) was used to measure role impairment. However, this version of the SDS contained an additional domain so that role impairment was assessed in the domains of "home management" (which was the additional domain), "work", "close relationships" and "social life" [6]. "Severe role impairment" was defined in the same way as in the French study as a self-rated impairment score of at least 7 out of 10 in any of the categories of functioning.

In the international sample, Alonso et al. (2018) found that 20.4% of students reported severe role impairment. The 12-month disorders that were associated with the highest odds of severe role impairment were MDD (aOR = 4.0; 95%CI = 3.3 - 4.8), GAD (aOR = 3.9; 95%CI = 3.1 - 4.8), and PD (aOR = 2.9; 95% CI = 2.4 - 4.2). The authors do not remark on this, but the confidence intervals for these results generally overlapped, which means that more statistical power will be needed before we can be certain which disorders are the most impairing. Nevertheless, when one combines the finding that MDD and GAD were strongly associated with severe role impairment, with Auerbach et al.'s (2018) finding that MDD (18.5%) and GAD (16.7%) were the most prevalent 12-month disorders in the international sample, it is clear that these disorders account for the largest proportion of the need for care in this population. It is interesting that alcohol abuse or dependence was associated with the lowest odds of any severe role impairment (aOR = 1.7; 95% CI = 1.3–2.2), and drug-use disorder had the second lowest odds of any severe role impairment (aOR = 2.1; 95% CI = 1.4–3.0). This indicates that the associations between these disorders and role impairment, although strong, were weaker compared to other CMDs. Alonso et al. also found that country membership – in addition to age, religion and sexual orientation – was associated with the

[6] For more information on this version of the SDS, see pp. 56-57.

odds of reporting severe role impairment, when controlling for CMDs and a large number of other variables. Interestingly, South African students, in addition to Northern Irish and German students, were among the populations with higher odds of severe role impairment. The authors observe that even though such variations in the levels of severe role impairment were observed between countries, the associations between CMDs and severe role impairment were similar internationally. The higher levels of severe role impairment in countries such as South Africa can therefore be due to reasons other than the CMDs included in the survey, such as physical health factors, CMDs that were not screened for, or social factors. It was common for students to have comorbid disorders, with 14.2% of students screening positive for at least one comorbid disorder compared to 17.2% of students who had pure disorders. The authors found that, after adjusting for specific disorders, additional disorders had a subadditive association with severe role impairment. This means the odds of severe role impairment increased with every additional disorder students had, but with a smaller amount than the odds associated with having the disorder on its own (Alonso et al., 2018). Using PARP analyses, the authors estimate that 12-month CMDs account for almost half (45.2%) of severe role impairment in the international sample. This should be interpreted together with the PARP for lifetime disorders, reported in the study below.

In the second WMH-ICS study, Alonso et al. (2019) found a generally monotonic relationship between comorbidity classes and severe role impairment. The prevalence of severe role impairment was highest in students with four or more disorders (78.3%), intermediate in students with comorbid internalising and externalising disorders (43.4%) as well as mostly internalising disorders (50%), and successively lower in students with pure disorders (23.9%), lifetime disorders with no 12-month prevalence (12.4%), and no lifetime disorders (6.3%). A similarly monotonic pattern was found for the mean number of days out of role. “Days out of role” was defined as the number of days in the last month when

respondents were totally unable to work or carry out their normal activities due to health reasons. Students with four or more disorders were most impaired, with 8.6 days out of role. Students with internalising and externalising disorders, and students with mostly internalising disorders, had intermediate levels of impairment, with a mean of 5.4 days and 5.5 days out of role respectively. The levels of impairment were successively lower in students with pure disorders, who had a mean of 3.1 days out of role; students who had lifetime disorders without 12-month prevalence, who had a mean of 2.4 days out of role; and lowest among students without any lifetime disorders, who had a mean of 1.4 days out of role. Based on PARP analyses, the authors estimate that lifetime CMDs account for more than half (64.6%) of the prevalence of severe role impairment, and almost half (44.3%) of days out of role (Alonso et al., 2019).

In the Spanish WMH-ICS study, conducted by Ballester et al. (2020), a little over a third of students screened positive for a 12-month CMD (35.7%), of which almost a third (29.2%) reported severe role impairment. The disorders that were most strongly associated with severe role impairment were PD (aOR = 4.0; 95% CI = 1.9 – 8.5), MDD (aOR = 2.4; 95% CI = 1.8 – 3.3) and GAD (aOR = 2.3; 95% CI = 1.6 – 3.2). It was also found that MDD (18.9%) and GAD (16%) were the most prevalent 12-month disorders, indicating that these disorders account for the largest proportion of the need for care in this population. Consistent with the general pattern in the literature, AUD was associated with the lowest odds of severe role impairment (aOR = 1.8; 95% CI = 1.1 – 2.8), and DUD was the only disorder that was not significantly associated with severe role impairment. Like the international sample, there was evidence that comorbidity had a subadditive effect on severe role impairment. Although the finding was not significant in this sample, it corroborates evidence for a phenomenon that is widely observed in the literature (Ballester et al., 2020).

Overall, a few important findings emerge from the studies of role impairment above.

First, university students generally rate MDD and GAD as the most impairing disorders, and because these disorders are also the most prevalent 12-month disorders they carry the brunt of the need for care in the university population. Second, it was found that almost half of students with 12-month disorders have at least one comorbid disorder, and that comorbid disorders most likely have a subadditive effect on role impairment, with each additional disorder increasing the odds of severe role impairment by a smaller amount than is associated with having the disorder on its own. Third, it appears that, independent of CMDs, there are differences in the amount of impairment that students from different countries report, with South Africa being one of the countries with elevated levels of severe role impairment. Finally, it seems that AUDs and DUDs are generally associated with lower levels of impairment than other CMDs in the university population. In the next section, I will explain why caution is indicated in interpreting the last result.

Why are substance use disorders less strongly associated with severe role impairment than other CMDs?

It is unclear why AUDs and DUDs are associated with lower levels of role impairment than other CMDs in the university population. However, some findings from the general population also indicate that alcohol and drug use disorders are associated with lower levels of role impairment. For instance, in the WMH Surveys, both alcohol abuse (1.9) and substance abuse (2.5) were associated with far fewer additional days totally out of role [7] than PD (14.3), MDD (9.0) and GAD (7.7) (Alonso et al., 2011). In the WMH Surveys, alcohol abuse (0.41) and substance abuse (0.77) were also associated with far fewer additional,

[7] "Additional days totally out of role" was defined as additional days in the past year when individuals with CMDs were totally unable to work or carry out their normal activities, compared to the baseline of individuals without these disorders.

partial disability days[8] compared to PD (1.28), MDD (1.65) and GAD (1.35) (Bruffaerts et al., 2012).

There is the possibility that impairment due to substance use is underreported. The most obvious reason is that people who abuse alcohol and drugs are commonly in denial about the seriousness of their condition (Heshmat, 2018). The use of alcohol and certain kinds of drugs is often more socially accepted among university students than the general population, and students may therefore be particularly likely to fail to recognise early signs and symptoms of impairment caused by their substance use disorders (Blanco et al., 2008). Furthermore, the relatively low levels of role impairment associated with AUDs and DUDs may partly be reflective of the lag between the onset of these disorders and their more serious consequences (Blanco et al., 2008). In other words, students may initially function relatively well when they abuse alcohol and drugs, but if they persist in these behaviours, the consequences catch up with them at a later stage.

Whatever the reason is why students with AUDs and DUDs report lower levels of severe role impairment than students with other CMDs, there is ample evidence of dangerous patterns of alcohol and drug use among university students that should not be overlooked. For instance, high rates of hazardous drinking, particularly binge drinking, among university students are reported both internationally and in South African universities. Among a national sample of college students in the United States, it was found that 44.7% binge drank at least once in the past month (Hingson, Zha, & Weitzman, 2009). Similarly, at Rhodes University in the Eastern Cape of South Africa, 48.6% of students binge-drank at least once per month (Maphisa & Young, 2018). High rates of binge-drinking were also found among students in the past two weeks at Stellenbosch University (50.2%) (Tolken, 2011), and in the past month

[8] "Additional partial disability days" was defined as the number of additional days in the past month when respondents with CMDs had functional limitations without being totally out of role.

at the University of the North (20.4%) (Peltzer, Malaka, & Phaswana, 2002).

Likewise, studies report high rates of substance use, including experimentation with illicit substances. For instance, in a sample of students from a large public university in the USA (n = 2 843), 16.6% reported marijuana use in the past 30 days, and 15% reported smoking cigarettes in the past 30 days (Cranford, Eisenberg, & Serras, 2009). In a sample of undergraduate students from eleven countries in Africa, including South Africa (n = 7 017), 17.2% reported infrequent use of illicit substances (1-9 times) in the past 12 months, and 3.5% reported frequent use of illicit substances (10 or more times) in the past 12-months (Peltzer & Pengpid, 2016).

Alcohol and drug use disorders can have various serious consequences that may in some cases be irreversible. For instance, Cservenka and Brumback (2017) conclude from a review of the neuro-imaging literature that "binge drinking among youth is associated with smaller/thinner cortical and subcortical structures and decreased WM [white matter] integrity" (p. 10), which indicates that binge drinking has a deleterious effect on adolescent brain development. The effects of binge and heavy drinking on the adolescent brain are associated with neurocognitive deficits in learning and memory, visuospatial abilities, and abstract thought and language (Zeigler et al., 2005). Furthermore, longitudinal studies have found that alcohol and other substance use disorders increase the risk for other CMDs (Fergusson, Boden, & Horwood, 2011; Johnson et al., 2000). Alcohol is also associated with high risk behaviours such as unsafe sex (Scott-Sheldon, Carey, Cunningham, Johnson, & Carey, 2016), interpersonal violence (Graham & Livingston, 2011), suicidality (Brown et al., 2008), and traffic injuries (Taylor et al., 2010), all of which lead to injury and morbidity among youth.

Marijuana, which has been legalised in many countries, including South Africa, and is the most commonly used and abused substance among South African youth (Dada et al.,

2019; Peltzer, Phaswana-mafuya, Africa, & Chancellor, 2012), has also been found to have long-term consequences. In a New Zealand birth cohort study known as the Dunedin Study, participants underwent neuropsychological testing at age 13 before the initiation of cannabis use, and again at age 38 after a pattern of cannabis use had developed in some of the participants (Meier et al., 2012). Meier et al. (2012) found that persistent cannabis use was associated with generalised neuropsychological decline, and that this decline was concentrated among adolescent-onset users, with more persistent use associated with greater decline. Furthermore, the "cessation of cannabis use did not fully restore neuropsychological functioning among adolescent-onset cannabis users" (p. 2657). The authors suggest that these findings are suggestive of a neurotoxic effect of cannabis on the adolescent brain (Meier et al., 2012). Similarly, from a review of the literature, England et al. (2017) conclude that nicotine exposure during adolescence is neurotoxic and is "associated with deficits in working memory, attention, and auditory processing, as well as increased impulsivity and anxiety" (p. 2). Other drugs of abuse among South African youth, such as methamphetamine (Thompson et al., 2004), cocaine (Majewska, 1996), opiates/heroin (Cunha-Oliveira et al., 2008) and inhalants (J. F. Williams et al., 2007) have all been shown to be neurotoxic, and to lead to cognitive, social and other types of impairment.

Sociodemographic predictors of role impairment

According to Carlton (2015), there is an increasing number of programs to support underrepresented populations on university campuses. It has been found that some underrepresented groups have higher odds of severe role impairment (Alonso et al., 2018; (Eisenberg et al., 2013). It is important to understand the associations between sociodemographic factors and role impairment in order to plan services and interventions for underrepresented student groups. A literature search reveals that the associations between

sociodemographic factors, CMDs and role impairment are far from settled: there are few studies that provide data on this subject, the studies are rarely repeated with the same populations, different methods are used, and often the results do not reach statistical significance. Although there are also hints of universal principles that govern some of the associations between sociodemographic factors and role impairment, it is still advisable to test the relevant assumptions in the particular community under study. In this study, self-reported population group, first-generation student status, gender, sexual orientation, physical disability and age are analysed as predictors of severe role impairment, when controlling for CMDs. A discussion of the selected sociodemographic factors and role impairment follows.

Population group

Population group is commonly associated with social adversity, and social adversity is associated with a higher risk of psychiatric disorders (Breslau et al., 2006). For instance, in both the USA (Shapiro, Meschede, & Osoro, 2013) and South Africa (Statistics South Africa, 2019b), poverty is stratified according to population group, and longitudinal studies in the USA (Sareen, Afifi, McMillan, & Asmundson, 2011) and lower middle income countries (Lund et al., 2010) have found that poverty is associated with a higher risk of CMDs. Race-based discrimination is also common, and being the object of such discrimination is associated with ill mental health (David R. Williams & Williams-Morris, 2000; Lee & Ahn, 2011). There is no evidence, however, for a consistent pattern of association between mental disorders and population group across different social contexts, which would have indicated the involvement of an underlying biological risk factor. Instead, the findings suggest that the

associations between population group and CMDs are socially contingent. Different patterns are also found for different disorders[9].

In the American Healthy Minds Study, it was found that Asian-American students (33.3%, $p < 0.01$) and multiracial students (41.4%, $p < 0.01$) generally had significantly higher rates of CMDs compared to white students (30.2%) (Eisenberg et al., 2013). However, with regards to specific disorders, students from minority population groups generally had lower odds of current anxiety disorders (PD and GAD) than white students, with the results for Asian students reaching statistical significance (OR = 0.70, 95% CI = 0.54 – 0.93, $p < 0.05$). On the other hand, the same minority students generally had higher odds of current depression than white students, with the odds for Asian students (OR = 1.49, 95% CI = 1.26 – 1.76, $p < 0.05$), Hispanic students (OR = 1.46, 95% CI = 1.24 – 1.71, $p < 0.05$) and multiracial students (OR = 1.32; 95% CI = 1.05 – 1.68, $p < 0.05$) reaching statistical significance. Self-identified Black students in the Healthy Minds Study were not more likely than self-identified White students to report role impairment due to depression and anxiety (which included academic, home and social impairments), but all of the other minority groups were more likely than white students to report role impairment due to these disorders (Eisenberg et al., 2013).

In the South African sample of the WMH-ICS, Bantjes et al. (2019) found that self-identified Black students consistently had lower odds of any 12-month CMDs compared to self-identified White students. Even though this result was not statistically significant, the sample included a sizeable proportion of both self-identified Black and self-identified White students, and the same trend was found for internalising disorders, bipolar disorder and externalising disorders (Bantjes et al., 2019). Alonso et al. (2019) and Alonso et al. (2018)

[9] This phenomenon is discussed with regards to the student population below, but is also observed in the general population (see Breslau et al., 2006; Kessler et al., 2005; and Stein et al., 2008).

did not study the associations between population group and role impairment in the international sample. The associations between population group and role impairment have also not been studied in the South African sample.

First-generation student

In the WMH-ICS, "first generation students" are defined as students who are the first of their family to attend university, and their parents' level of education is used as an indicator of their first-generation status. Various studies have found that groups of first-generation students are more likely than non-first generation students to come from disadvantaged backgrounds, to experience financial and social stresses, to have higher rates of attrition, and to have elevated levels of psychological distress and mental illness (Covarrubias, Romero, & Trivelli, 2015; McFadden, 2016; Stebleton, Soria, & Huesman, 2014).

Curiously, in the international sample of the WMH-ICS, Auerbach et al. (2018) did not find any significant associations between first-generation student status and CMDs. Bantjes et al. (2019) similarly did not find any significant associations between first-generation status and CMDs in the South African sample. Furthermore, Alonso et al. (2019) and Alonso et al. (2018) did not find any significant associations between first-generation student status and role impairment in the international sample. It has not been investigated whether the same is true of the South African sample.

Gender

In the WHO WMH Surveys, it was found that women in the general population have a slightly higher lifetime risk of CMDs compared to men (Seedat et al., 2009). However, the results varied for the different disorders that were assessed. Whereas women had significantly higher risk of mood disorders (OR = 1.8; 95% CI = 1.7-1.8, $p \leq 0.05$) and anxiety disorders

(OR = 1.7; 95% CI = 1.6-1.8, $p \leq 0.05$), their risk of externalising disorders (OR = 0.7; 95% CI = 0.6-0.8) and substance use disorders (OR = 0.3; 95% CI = 0.2-0.3) were significantly lower than those of men (Seedat et al., 2009).

In both the international (Auerbach et al., 2018) and South African samples (Bantjes et al., 2019) of the WMH-ICS, female students were more likely than male students to screen positive for any lifetime CMD, 12-month CMD, and 12-month prevalence among lifetime cases. However, Auerbach et al. (2018) note that these results may be skewed, seeing that there are more internalising disorders than externalising disorders in the survey, and it is known that women suffer more from internalising disorders than men do.

In a study of Serbian students (n = 1 624), Klemenc-Ketis et al. (2011) found that female students generally had significantly lower levels of functioning compared to men, which was indicated by lower scores on all of the subscales of the SF-36 except for physical role functioning. However, the SF-36 is a generic measure of health-related quality of life and functioning that does not distinguish between mental and physical health[10], and the authors did not control for CMDs when they analysed gender differences using this scale. Therefore, the result indicates that female students are generally more impaired than male students, without indicating whether this is due to differences in their mental health diagnoses, or for some other health reason.

When Alonso et al. (2018) controlled for CMDs in their analysis of the international sample of the WMH-ICS, they found statistically significant indications that women might have lower odds of any severe role impairment than men (aOR = 0.9; 95% CI = 0.8-1.0; $p \leq 0.05$), as well as significantly less impairment in the domain of close relationships (aOR = 0.8; 95% CI = 0.7-0.9; $p \leq 0.05$). Because differences in the mental health diagnoses of men and women were taken into account and left aside in this analysis, the discrepancy in

[10] For more information on the SF-36, see pp. 58-59.

functioning between men and women must be due to reasons other than their respective mental health diagnoses, which may, for instance, include physical health, coping strategies and social factors. The evidence above provides tenuous support for an association between gender and role impairment in the university population. This analysis has not yet been completed for the South African sample.

Sexual minorities

Mental health issues are more prevalent among sexual minorities than among heterosexual people in the general population (Cochran, Sullivan, & Mays, 2003; Sandfort, de Graaf, Ten Have, Ransome, & Schnabel, 2014) as well as in the student population. For instance, in the Healthy Minds study, bisexual and gay students had higher odds of MDD and Anxiety Disorder (PD or GAD) than heterosexual students (Eisenberg et al., 2013); in the American College Health Association National College Health Assessment II Survey, lesbian women had worse mental health outcomes than heterosexual women in all of the areas that were studied (Kerr, Santurri, & Peters, 2013); and in the WMH-ICS (Auerbach et al., 2018), including the South African sample (Bantjes et al., 2019), sexual minority students had higher rates of CMDs than heterosexual students.

According to Zietsch et al. (2012), the ‘minority stress’ hypothesis provides the dominant explanation for elevated rates of CMDs among sexual minorities. The argument being made with this model is that mental health problems in sexual minorities are provoked by social prejudice and discrimination. This explanation makes intuitive sense, since communities of sexual minorities have certainly experienced, and still experience, high levels of discrimination in the general public and also on university campuses. Until recently, ‘homosexuality’ was even pathologised in the psychological professions. The American Psychiatric Association only removed ‘homosexuality’ from the list of mental disorders in

1973, and the World Health Organization removed it from the International Classification of Diseases (ICD) in 1990 (Fauman & Hopkinson, 2010). In the USA, LGBTQ rights have advanced greatly since the Stonewall Riots of 1969 (Fauman & Hopkinson, 2010), but discrimination in areas such as housing and employment are still legal under federal law (Caspani, 2019; Liptak & Peters, 2020), and LGBTQ rights vary by state jurisdiction (Human Rights Campaign, 2020). LBTQ students in the USA also still experience high levels of prejudice and discrimination on college campuses (Winberg et al., 2019; Woodford, Kulick, & Atteberry, 2015; Woodford, Silverschanz, Swank, Scherrer, & Raiz, 2012; Worthen, 2018). Although South African laws protecting sexual minority groups are far more progressive than those in the USA, sexual minorities in South Africa also still experience high levels of prejudice and discrimination in the general public, as well as on university campuses (Arndt & Bruin, 2006; Cishe, Twaise, Goon, & Abaver, 2014; Mwaba, 2009).

The minority stress model is not the only theory used to explain mental health disparities between heterosexual people and sexual minorities. Several studies suggest that sexual minority status and mental illness share a set of causes, including genetic factors, and environmental factors other than discrimination (Sandfort et al., 2014). For instance, Zietsch et al. (2012) examined a large community sample of adult twins (n = 9 884). The authors found large overlap in the genetic factors that were associated with sexual minority status and depression. Minority sexual orientation and depression also shared environmental risk factors, including childhood sexual abuse and risky family environment (Zietsch et al., 2012). The minority stress hypothesis therefore does not provide a complete explanation of elevated levels of CMDs among sexual minorities, as there are additional causes of this phenomenon such as genetic factors and child abuse.

In the international sample of the WMH-ICS, Alonso et al. (2018) found that sexual minority status is a strong predictor of severe role impairment among university students,

independently of CMDs. The authors completed separate analyses for different groups of sexual minorities: sexual minority students who engage in same-sex intercourse, sexual minority students who do not engage in same-sex intercourse, and heterosexual students who report some same-sex attraction. Compared to purely heterosexual students, sexual minority students who engage in same-sex intercourse (aOR = 1.5; 95% CI = 1.1 - 1.9, $p \leq 0.05$), sexual minority students who do not engage in same-sex intercourse (aOR = 1.6; 95% CI = 1.2 - 2.1, $p \leq 0.05$), and heterosexual students with some same-sex attraction (aOR = 1.6; 95% CI = 1.3 - 1.9, $p \leq 0.05$) all had significantly higher odds of severe role impairment, independently of CMDs. Heterosexual students with some same-sex attraction also had significantly higher odds of severe role impairment in all of the domains that were assessed, namely home management (aOR = 1.5; 95% CI = 1.1 - 2.1, $p \leq 0.05$), university-related work (aOR = 1.3, 95% CI = 1.0 - 1.7, $p \leq 0.05$), close relationships (aOR = 1.6, 95% CI = 1.3 - 2.0, $p \leq 0.05$) and social life (aOR = 1.6; 95% CI = 1.3 - 2.0, $p \leq 0.05$). In comparison, the results for the other subgroups of sexual minority students were significant in most of the categories. This analysis has not yet been done for the South African sample.

Students with disabilities

It has been found that people with physical disabilities are at increased risk of CMDs, such as anxiety and depression, and that this can be attributed to the distress and the chronic stress of being disabled (Turner, Lloyd, & Taylor, 2006; Turner & McLean, 1989; Turner & Noh, 1988). It has also been found that physical disability is most strongly associated with mental health among younger age groups (Turner, Lloyd, & Taylor, 2006), which is of course pertinent to a study of the mental health of university students.

Auerbach et al. (2018) did not analyse disability as a risk factor for CMDs in the international WMH-ICS sample. Nevertheless, in the South African sample, Bantjes et al.

(2019) found that students with disabilities experienced higher odds of any lifetime CMDs (aOR = 1.61; 95% CI = 1.22, 2.12, $p \leq 0.05$), any 12-month CMDs (aOR = 1.56; 95% CI = 1.17, 2.07, $p \leq 0.05$), and 12-month prevalence among lifetime cases (aOR = 1.54; 95% CI = 1.15, 2.05, $p \leq 0.05$). It is reasonable to expect that, apart from any particular mental health diagnosis, students with physical disabilities will also report more role impairment than their peers due to the additional challenges of being disabled. However, neither Alonso et al. (2018) nor Alonso et al. (2019) analysed disability as a predictor of severe role impairment in the combined WMH-ICS sample, and this analysis has also not been done for the South African sample.

Age

The lifetime prevalence of CMDs in any given cohort will naturally increase with age, as more time is allowed for CMDs to emerge over the course of the lifetime. On the other hand, surveys from various countries show that the risk of 12-month CMDs decreases with age, which indicates that people struggle less actively with CMDs as they get older (Andrews, Henderson, & Hall, 2001; Herman et al., 2009a; Kessler et al., 1994). We also know when the risk profile for 12-month disorders plateaus and starts to decrease. In the National Comorbidity Survey (NCS), in which a sample was taken from the general US population that was very evenly distributed in terms of age, it was found that the odds of 12-month CMDs was highest in the 15-24 age group (which coincides with the university years), lower in the 25-34 age group, and successively lower in the older age groups in the 15-54 age range that was examined (Kessler et al., 1994). We therefore know that 12-month prevalence plateaus, and starts to decrease somewhere between 15 and 34 years.

In the international sample of the WMH-ICS, it was found that, compared to students who were 18 years old, students who were 19 years old and students who were 20 years and

older had significantly higher odds of 12-month CMDs (Auerbach et al., 2018). Alonso et al. (2018) also found that older students had higher odds of severe role impairment than younger students, independently of CMDs. Particularly, compared to 18-year-old students, 19-year-old students had significantly higher odds of severe impairment in the areas of close relationships (aOR = 1.3; 95% CI = 1.1-1.6, $p \leq 0.05$) and social life (aOR = 1.3; 95% CI = 1.1-1.6, $p \leq 0.05$). In comparison, students who were 20 years and older had significantly higher odds of impairment in all of the domains that were assessed, namely home management (aOR = 1.6; 95% CI = 1.2-2.0, $p \leq 0.05$), work (aOR = 1.3; 95% CI = 1.0 – 1.6, $p \leq 0.05$), close relationships (aOR = 1.4; 95% CI = 1.1-1.8, $p \leq 0.05$) and social life (aOR = 1.6; 95% CI = 1.3-2.0, $p \leq 0.05$) (Alonso et al., 2018). These patterns are found because the first-year sample is naturally biased toward students in their late teens and 20's, and only indicates that the prevalence of 12-month CMDs increases with advancing age in this age bracket. We know based on the results of Kessler et al. (1994) that this growth trend will plateau and begin to reverse somewhere between 15 and 34 years. The analysis of age and severe role impairment has not yet been repeated with the South African sample.

The measurement of role impairment

Statistical studies of mental illness have been conducted at least since the 19th century, but work in the area of mental health that can strictly be called epidemiological only started in the 20th century (Lovell, 2014). According to Burger and Neeleman (2007), in the history of psychiatric epidemiology using community samples, three generations of studies can be identified. The first two generations of studies used broad definitions of mental illness, and unreliable data-collection methods, that produced statistics that could not be fruitfully compared. The third generation of studies, initiated around 1970, is known for increasingly reliable psychiatric diagnoses, which was enabled by the development of reliable diagnostic

criteria eventually published in the DSM-III in 1980 (Burger & Neeleman, 2007). According to Burger and Neeleman (2007), the DSM-III was a watershed event in the history of mental health, because it made a decisive shift from the previous psychoanalytic paradigm to a medical model of mental illness, which also included the first presumably neutral and objective definitions of mental illness. This went along with the development of reliable survey instruments that could be used on a large scale to generate comparable epidemiological statistics based on standardised methods (Burger & Neeleman, 2007). Furthermore, the third generation of psychiatric surveys are characterised by increasing national and international collaboration in the measurement of mental disorders, and the planning of worldwide studies (Wittchen, 2000). The Global Burden of Disease Study (GBD), the WMH Surveys, and the WMH-ICS Surveys, all of which were coordinated by WHO, are part of this relatively recent phenomenon of international studies that apply standardised methods in psychiatric epidemiology. The remainder of this chapter consists of a discussion of the methodologies that were used to measure role impairment in the Global Burden of Disease Study and the WMH Surveys. This will form the rationale for the decision to use the SDS to measure role impairment in the WMH-ICS and the present study.

The Global Burden of Disease Study

The first Global Burden of Disease Study (GBD 1990) was undertaken collaboratively by WHO and the World Bank, with key involvement from Harvard University, as background for the World Bank's "World development report 1993: investing in health" (Murray, Lopez, & Jamison, 1994, p. 495). Traditional measures of the burden of disease had relied mostly on mortality statistics, which describe the causes of death. The GBD study was the first international study to also include measures of disability to estimate the burden of disease (Ustün, 1999). The first GBD study therefore shone a spotlight on CMDs, which are

not traditionally identified as a cause of death[11], and therefore did not feature in former estimates of the burden of disease (Ustün, 2008). It was made clear that, although CMDs are not traditionally associated with death, they are severely disabling. For the first time, CMDs were ranked in the public health top 10 priority lists among the 107 diseases that were measured (Ustün, 2008, p. 1315). Moreover, depressive symptoms received attention as the single leading cause of disability worldwide when measured in Years Lived With Disability (YLDs) (Ustün, 2008).

Three core measures are used in the GBD to calculate the burden of disease: (1) Years Lived With Disability (YLDs), (2) Years of Life Lost due to premature mortality (YLLs), and (3) Disability Adjusted Life Years (DALYs). YLDs express the morbidity associated with injuries and illnesses. It is calculated by multiplying the number of incident cases of a health condition[12] with the duration of the health condition (expressed in years) and a disability weight that factors in the severity of the condition, ranging from 0 (perfect health) to 1 (dead) (Prüss-Üstün et al., 2003). YLLs, on the other hand, express the premature mortality associated with injuries and illnesses. It is calculated by multiplying the number of deaths due to a disease by the standard life expectancy at the time that death occurs (Prüss-Üstün et al., 2003). Finally, DALYs are calculated by adding YLLs and YLDs together to produce a summary measure of disability and premature mortality (Prüss-Üstün et al., 2003). The DALY measure enables the GBD to compare health conditions that cause high levels of mortality (YLL), such as lung cancer, with conditions such as CMDs that cause low levels of mortality (YLL) but high levels of disability (YLD) (Prüss-Üstün et al., 2003). Common mental disorders are associated with a high YLD score in particular, because these disorders

[11] Even though CMDs may cause early mortality, such as death by suicide, these deaths are generally not attributed to CMDs, which means that the number of deaths associated with CMDs, although probably lower than many physical disorders, is nevertheless also underestimated (Vigo, Thornicroft, & Atun, 2016).
[12] The GBD uses the term ‘disability’ instead of ‘health conditions’ as it is used in this formulation. I use the term ‘health conditions’ for clarity here, seeing that the GBD uses the term ‘disability’ synonymously with terminology for health conditions, including any illness or injury that detracts from the ideal of perfect health.

typically start early in life, cause severe levels of disability, and generally do not cause early mortality (Weissman, 2009). This also results in a high DALY score for CMDs compared to physical disorders, even though CMDs are not traditionally considered as a cause of death (Weissman, 2009).

The WMH Surveys initiative

According to Harvard Medical School (2005), the global burden of disease study was largely based on literature reviews and limited, isolated studies, rather than cross-national epidemiological surveys. This formed part of the rationale for organising the WMH Surveys initiative, which sought to conduct cross-national epidemiological surveys on a large scale.

The authors of the WMH Surveys initiative used the World Mental Health Composite International Diagnostic Interview (WMH-CIDI) as their survey instrument. This survey instrument was derived from a previous version, the World Health Organisation Composite International Diagnostic Interview (WHO-CIDI), which in turn was derived from the Diagnostic Interview Schedule (DIS). The DIS is described as "the first fully structured psychiatric diagnostic interview that could be administered by trained lay interviewers" (Kessler & Üstün, 2004, p. 93). These survey instruments form the theoretical backbone of the survey instrument that was used in the WMH-ICS.

The role impairment associated with CMDs only received more serious attention with the publication of the WMH-CIDI, the latest instrument used in the WMH Surveys. The decision to focus more sharply on role impairment in the WMH-CIDI was motivated partly by widespread criticism that the DIS and the WHO-CIDI before it were overly inclusive, based on the high prevalence statistics that they generated (Kessler & Üstün, 2004). The same criticism was levelled at the APA's DSM criteria, because these criteria formed the foundation of the DIS, and played an integral role in the development of the WHO-CIDI,

which was adapted from the DIS to give diagnoses based on the ICD (Spitzer & Wakefield, 1999). In response, the APA added a clinical significance criterion to a large number of disorders in the DSM-IV, published in 1994 (Kessler & Üstün, 2004). The clinical significance criterion requires that disorders cause "clinically significant distress or impairment in social, occupational, or other important areas of functioning" (American Psychiatric Association, 2013, p. 21). According to Kessler and Üstün (2004), the original WHO-CIDI contained "only one dichotomous disorder-specific role impairment question for all disorders: 'Did (the disorder) ever interfere a lot with your life or activities?'" (p.p. 104-105). For the updated WMH-CIDI, the authors expanded on this question to break down the clinical significance criteria set out in the newly published DSM-IV. In this project, they relied heavily on the WHO Disability Assessment Schedule (WHO-DAS 2.0) (World Health Organisation, 2018a) and the Sheehan Disability Scale (SDS) (Kessler & Üstün, 2004).

The WHO-DAS

The WHO-DAS is the operationalised version of the International Classification of Functioning, Disability and Health (ICF), which is the standardised disability compendium attached to the ICD, the international diagnostic system in medicine (Üstün, Chatterji, Bickenbach, Kostanjsek, & Schneider, 2003). The ICF authors promote a biopsychosocial model of disability that has had a strong influence on disability research and policy. In the rationale for the decision to use a biopsychosocial model, the authors self-consciously took the middle ground between the traditional, so-called medical model of disability, and the social model of disability that was proposed by disability rights activists.

According to Roulstone, Thomas and Watson (2012), the disability rights movement of the 1960s drew inspiration from and shared ideas with other civil rights movements, such as those of African Americans, women and sexual minorities. The disability rights movement

has not only had a major impact on the way disability is understood and measured today, but it has also had a major impact on international disability policies, including that of South Africa (Barnes, 2007; Howell, Chalklan, & Alberts, 2006; Loeb, 2009). The movement based their activism on the intellectual foundation of the social model of disability, which was developed by the Union of the Physically Impaired Against Segregation (UPIAS), a disability activist organisation in the UK (Barnes, 2012). Activists used a social model of disability, as opposed to the medical model of disability, to shift attention to the challenges that society creates for people with impairments. The medical model of disability posits that the relationship between health conditions and disability is a one-way street. A medical condition, such as lower body paralysis, implicitly entails some kind of disability, in this case being disabled in the lower part of your body to the extent that you cannot move. A medical condition, such as lower body paralysis, is therefore at the same time a disability of some kind, and is in this sense synonymous with disability. From this perspective, even a cough is a disability. This way of looking at disability is evident in the GBD study, where the authors literally equate, with a special note, health conditions with disability for the purposes of their narrative, using the example of a cough that I use above (Prüss-Üstün et al., 2003). In contrast, in the social model of disability, the UPIAS retained the definition of impairment as a health issue, but they redefined disability as a social issue that is added on top of bodily impairments by remediable aspects of the physical and social environments (Andrews, Fourie, & Watson, 2006). For instance, if a person with lower body paralysis, a physical impairment, has problems with mobility due to the lack of wheelchairs, or wheelchair ramps, disability rights activists would argue it is happening because he is disabled, not because he is impaired. The same man, they argue, would still be impaired in a place with wheelchairs and wheelchair ramps, because it is a fact of his body that he is paralysed in his lower half. Nevertheless, in this environment, he would no longer be disabled, because he would be able

to move around freely using a wheelchair. According to Andrews et al. (2006), the activists' goal with the social model was "to change public awareness" by defining disability as a social rights issue (p. 245). Ultimately, their idea was to change disability into something that can be alleviated with technology and good social policies.

At the time the Disability Rights Movement began, the WHO was working to classify the outcomes of disease in the International Classification of Impairments, Disabilities and Handicaps (ICIDH). They used the traditional, medical definition of disability in this project (Hurst, 2003). The Disability Rights Movement therefore saw the ICIDH as an obstacle to disability rights, and called for a revision (Hurst, 2003, p.574). In 2001, at the end of a long revisioning process, the ICIDH was updated with the ICF (De Kleijn-de Vrankrijker, 2003). The authors of the ICF self-consciously took the middle-ground between the medical model and the social model of disability, both of which they viewed as too extreme (World Health Organisation, 2002). In the ICF's biopsychosocial model of disability, disability is described as the product of an interaction between health conditions (diseases, disorders and injuries) and contextual factors that shape the resulting experience of disability (WHO, 2002). Within this schema, one can refer to the following: (1) impairments, which are specific structural or functional problems on the level of the body or the mind, such as deviation or loss, (2) activity limitations, which are limitations on the level of the person as a whole, with "activities" referring to things like "difficulty grasping objects" in the case of leprosy, or being incapable of going out alone in the case of panic disorder, and (3) participation restrictions, which are limitations that people with impairments may experience in a social context, such as where a person with lower body paralysis is unable to access a concert due to the lack of wheelchair ramps, or a person with social phobia is unable to make friends due to negative reactions to the disorder (World Health Organisation, 2002, p.p. 10, 17).

The WMH-ICS and the Sheehan Disability Scale (SDS)

The developers of the WMH-ICS kept the role impairment section of the survey instrument short compared to the WMH Surveys. The WMH-ICS survey instrument did not contain any items from the WHO-DAS. Instead, only the Sheehan Disability Scale (SDS) was used to assess health-related role impairment during the past 12 months in the domains of "home management", "work", "close relationships" and "social life" (Andrew C. Leon, Olfson, Portera, Farber, & Sheehan, 1997). The interactions between CMDs and the environment that create psychiatric disability cannot be captured with the SDS like it can with the WHO-DAS, which is one of its shortcomings.

Another way the WMH-ICS role impairment section was kept short, compared to the WMH Surveys, was by reducing the number of iterations in the survey. The WMH Surveys initiative used the SDS, along with other instruments such as the WHO-DAS, to ask respondents to rate the impairment associated with each CMD individually (Kessler & Üstün, 2004). The WMH-ICS, on the other hand, asked students to provide a global rating of impairment due to physical and mental health problems during the past year, due to any reason pertaining to mental or physical health (Alonso et al., 2018), which means that they only had to ask the role impairment questions once.

The SDS is a self-rated measure of role impairment that was originally developed by Dr David Sheehan in 1981 for use in psychiatric treatment outcome studies (Sheehan, 1983; Sheehan et al., 1996). The original SDS is a three-item measure of impairment in the domains of "work/study", "social life", and "family life/home responsibilities" (Sheehan & Sheehan, 2008, p. 71). In both the WMH Surveys and the WMH-ICS, a four-item version of the SDS was used. This version was created by turning the original "family life/home responsibilities" item into two separate items, namely "close relationships" and "home management". The SDS is ideal for international epidemiological studies such as the WMH-ICS, seeing that it

has been widely used, and as of 2007 has been translated into 48 languages. The SDS also has good psychometric properties (Andrew C. Leon et al., 1997; Coles, Coon, DeMuro, McLeod, & Gnanasakthy, 2014; Hodgins, 2013; Leon, Shear, Portera, & Klerman, 1992; Sheehan & Sheehan, 2008).

Alternative measures of role impairment

The WMH-ICS is an online survey, and therefore a self-rated scale such as the SDS was needed to measure role impairment. The SDS was chosen from among a number of self-rated measures that are widely used to measure role impairment in psychological studies, including the Social Adjustment Scale Self-report (SAS-SR) Short and Screener versions, the Medical Outcome Study (MOS) SF-36 and SF-12 versions, and the Work and Social Adjustment Scale (WSAS) (see the summary in Table 1 below). The SDS has many advantages over these alternative scales of role impairment, one of which is that it is the briefest, and yet it is comprehensive. Compare the SDS to the other scales as seen in Table 1. It is clear that the SDS covers the full variety of domains that are meaningful in the university context using the smallest number of items. Another advantage is that the SDS was used in the WHO WMH Surveys, and therefore reusing the SDS in the WMH-ICS advances the goal of standardising the methods of psychiatric measurement. A short discussion of the alternative measures of role impairment that were identified above follows.

The Social Adjustment Scale Self-report (SAS-SR)

The Social Adjustment Scale Self-report (SAS-SR) is a 42-item self-report questionnaire that is rated on a Likert scale (Weissman & Bothwell, 1976). According to Weissman and Bothwell (1976), the SAS-SR was developed from the foundation of the Social Adjustment Scale (SAS), which in turn was derived from the Structured and Scaled Interview to Assess

Maladjustment (SSIAM). The major difference between the SAS-SR and its forerunners is that the SAS-SR is self-rated, whereas the others are clinician-rated. As a self-report scale, the SAS-SR is inexpensive and simple to administer. Furthermore, interviewer bias is removed from the process of data collection (Weissman & Bothwell, 1976).

The SAS-SR was developed to be used with individuals 17 years and older and covers a wide range of functioning, including work as a worker, housewife or student, general social and leisure activities, and relationships with significant others and family (Gameroff, Wickramaratne, & Weissman, 2012). The SAS-SR was written at a fourth grade reading level and has been translated into 17 languages, which makes it easy to understand and easily adaptable for international studies (Gameroff et al., 2012). The SAS-SR has good psychometric properties (Achard et al., 1995; Gorenstein et al., 2002; Weissman & Bothwell, 1976; Weissman, Prusoff, Thompson, Harding, & Myers, 1978). Although the SAS-SR is widely used, the original version is quite lengthy. For this reason, two shorter versions of the instrument were developed, namely the SAS-SR: Short (24 items) and the SAS-SR: Screener (14 items). Both versions retain the original areas of coverage, but sacrifice some detail for brevity. Like the original, both alternative scales have good psychometric properties (Gameroff et al., 2012).

The Medical Outcome Study (MOS) Short Form (SF) 36

The SF-36 was developed as part of the Medical Outcomes Study, which was a 2-year observational study of patients with chronic health conditions (Khanfer et al., 2013; Ware, 2000). According to Ware and Gandek (1994), the SF-36 is a generic health-related quality of life instrument that can be used for physical and mental disorders, and with different populations. The scale consists of 36 questions that are organised in a Physical Functioning Scale and a Mental Health Scale, and six additional scales that apply to mental and physical

health to different degrees. The domains assessed are: 1) limitations in physical activities because of general health problems, 2) limitations in role activities because of physical health problems, 3) limitations in role activities because of emotional health, 4) limitations in social activities because of physical or emotional health problems, 5) bodily pain (intensity and interference in normal work), 6) general mental health (psychological distress and wellbeing), 7) vitality (energy/fatigue) and 8) general health perceptions (Ware, 2000; Ware & Gandek, 1994).

There is a shorter version of the SF-36 available, namely the SF-12, which consists of only 12 items but still retains the original domains of the SF-36 (John E. Ware, Kosinski, & Keller, 1995). Both the SF-36 (McHorney, Ware, Jr., Lu, & Sherbourne, 1994) and the SF-12 have good psychometric properties. However, the SF-12 is naturally less detailed and precise than the SF-36 (Ware et al., 1995). Therefore, according to Ware et al. (1995), the SF-12 is most effectively employed as an alternative to the SF-36 when large samples are used and overall impressions of physical and mental health outcomes are sought.

The Work and Social Adjustment Scale

The Work and Social Adjustment Scale (WSAS) is a 5-item self-report questionnaire that is used to assess the role impairment associated with CMDs (Pedersen, Kvarstein, & Wilberg, 2017). The WSAS is more similar to the SDS than any other scale discussed above. According to Pedersen, Kvarstein and Wilberg (2017), the original WSAS only contained four items assessing: 1) ability to work or study, 2) home management 3) social leisure activities and 4) private leisure activities. A fifth item was later added to assess “the ability to form and maintain close relationships with others”. Each of the items of the WSAS are rated on a nine-point Likert scale, from “Not at all (0) to Severely impaired (8)” (Pedersen, Kvarstein, & Wilberg, 2017, p.p. 215-216). The WSAS has good psychometric properties

(Crawford et al., 2011;Mundt, Marks, Shear, & Greist, 2002; Pedersen et al., 2017; Zahra et al., 2014).

Table 1. Popular measures of role impairment

Scale name	**Number of items**	**Mode of administration**	**Areas assessed**
WMH-ICS version of the Sheehan Disability Scale (SDS)	4	Self-rated	i. Academic work ii. Home management iii. Social life iv. Close relationships
Work and Social Adjustment Scale (WSAS)	5	Self-rated	i. Work ii. Home management iii. Social leisure activities iv. Private leisure activities v. Close relationships
WMH version of the WHO-DAS[13]	19	Interviewer-rated[14]	i. Role impairment (e.g. work and normal activities) ii. Understanding and communicating iii. Mobility iv. Self-care v. Getting along with others

[13] See a description of the WMH version of the WHO-DAS in (Scott, McGee, Wells, & Browne, 2006)
[14] The WMH Surveys were administered by interviewers, but self-rated and proxy-rated versions of the WHO-DAS are also available (see World Health Organisation, 2018b).

WHO-DAS (2.0) 12-item version[15]	12	Interviewer-rated/self-rated/proxy-rated	i. Cognition – understanding and communicating ii. Mobility – moving and getting around iii. Self-care– hygiene, dressing, eating and staying on own iv. Getting along– interacting with other people v. Life activities– domestic responsibilities, leisure, work and school vi. Participation– joining in community activities
Social Adjustment Scale Self-report (SAS-SR): Screener	14	Self-rated	i. Work (paid worker/ unpaid housework/ student) ii. Social and leisure activities iii. Relationships with extended family iv. Role as a marital partner v. Parental role vi. Role within the family unit
Medical Outcome Study (MOS)	12	Self-rated	i. Limitations in physical activities because of general health problems.

[15] The WHO-DAS 12-item version is a shorter alternative to the version used in the WMH Surveys. A description of this version can be found in (World Health Organisation, 2018b).

Short Form (SF) 12			ii. Limitations in role activities because of physical health problems. iii. Limitations in role activities because of emotional health problems. iv. Limitations in social activities because of physical or emotional health problems. v. Bodily pain (intensity and interference in normal work) vi. General mental health (psychological distress and wellbeing) vii. Vitality (energy/fatigue) viii. General health perceptions

Chapter 3: Methodology

In this chapter, the methodology that was used in the study is described, including the aims and context of the study, the measures that were used, the data analysis procedures that were followed, and ethical considerations.

Research Aims:

The study has four aims:

1. To determine the prevalence and severity of role impairment among first-year university students.
2. To determine if there are statistically significant differences in the prevalence of role impairment between students with and without 12-month CMDs.
3. To explore associations between severe role impairment and CMDs, when controlling for sociodemographic factors.
4. To identify which CMDs are the most impairing and prevalent in the population.

Research design

As discussed in chapter 1, the study was conducted with the paradigm of evidence-based public mental health, which is grounded in positivism. This means that the rationale and methods of the study were shaped by a strong theoretical framework, which was also used to interpret the study findings. Nevertheless, the study is still exploratory in the sense that bottom-up, data-driven processes of analysis were used to generate the raw statistical results of the study (Stebbins, 2001), as discussed below under data collection. These exploratory methods of analysis were particularly useful in the present study, for two reasons. The study was conducted at an early stage of WMH-ICS research in South Africa. It was therefore useful to first explore broad patterns in the data, and allow the data to speak for itself, before

focusing and delving deeper. Furthermore, little is known about the associations between role impairment, CMDs and selected sociodemographic factors in the student population, particularly the South African student population. It was therefore useful to suspend any preconceptions as far as possible.

Context of the study

The study forms part of the international WHO WMH-ICS initiative (Cuijpers et al., 2019, p. 2). The South African WMH-ICS survey project was conducted at Stellenbosch University (SUN) and the University of Cape Town (UCT), which are two large, residential universities in the Western Cape, South Africa. Both universities describe themselves as research-intensive, and are ranked in the top 500 universities worldwide (World University Rankings, 2019).

In 2016, 30 854 students were enrolled at SUN, of which 63% were enrolled in undergraduate programs and 33% in postgraduate programs, and 4% were occasional students (non-degree purposes). Of the students enrolled in 2016, 61.3% were White, 18.3% were Black African, 17.6% were Coloured, and 2.8% were Indian (Stellenbosch University, 2018). In 2016, 29 231 students were enrolled at UCT, of which 63% were undergraduates and 37 % were postgraduates. Of the total student population, 42.9% were Black South Africans, Coloureds and Indians, and 27.3% were White South Africans. Of the total student population, 11% chose not to declare their “race” (University of Cape Town, 2016, p. 17).

Data collection

The data for this analysis was collected in 2015 and 2017 via an online survey. An invitation to complete the survey was sent to all students over the age of 18. The only requirement was that students were registering at the university for the first time, regardless

of the length of the degree they were enrolled for. A total of 10 306 students received the invitation to participate in the study, of which 1 115 completed the survey, yielding a response rate of 10.8%.

Measures

Items for the e-survey were selected from a variety of widely used epidemiological surveys and measures:

1. *Sociodemographic data.* Sociodemographic questions were adapted from the World Mental Health Survey initiative version of the World Health Organization Composite International Diagnostic interview (WMH-CIDI) (Kessler & Üstün, 2004). Participants were asked to identify their gender, age, population group, sexual orientation and whether they had a serious physical impairment. For population group, students had to choose between (1) Black, (2) Coloured, (3) Indian, (4) White and (5) international (non-South African). These terms were used in the survey because they continue to be used broadly in the country to report census data, as well as in contemporary legislation and discourse about the transformation of universities. Students who self-identified as Black-African, Coloured or Asian were coded as Black. This broad definition of Black was meant to capture groups that have historically been marginalised in higher education in South Africa. The intention with using this classification was to explore the possibility of ongoing social and political inequality in post-apartheid South Africa. The use of these terms was not intended to reify sociocultural constructs about ancestry, or to imply that such categories have a biological basis. For sexual orientation, students had to choose between (1) heterosexual or straight, (2) gay or lesbian, (3) bisexual, (4) asexual, (5) not sure, and (6) “other”, with a free response allowed for the last option. Following the APA style

guidelines, sexual orientation was coded as "heterosexual" (i.e. no same sex attraction) or "sexual minority groups" (i.e. lesbian, gay, bisexual, asexual or questioning). "First-generation students" were differentiated from students whose parents had completed university by asking about the parents' level of education. The options were: (1) none, (2) elementary school, (3) secondary school, (4) some post-secondary education, (5) university graduate, (6) doctoral degree, (7) don't know.

2. *Common mental disorders.* Mental health data were collected with the WMH-ICS survey instrument, which was developed by the World Mental Health Survey Consortium. Items adapted from the Composite International Diagnostic Interview Screening Scales (CIDI-SC) (Kessler et al., 2013) and the Alcohol Use Disorders Identification Test (Saunders, Aasland, Babor, De La Fuente, & Grant, 1993) were used to assess lifetime history of major depressive disorder (MDD), generalised anxiety disorder (GAD), bipolar spectrum disorder (BP), alcohol use disorder (AUD), and drug use disorder (DUD). Consistent with other studies in the WMH-ICS, DUD was defined as "abuse or dependence either on cannabis, cocaine, or any other street drug, or on a prescription drug either used without a prescription or used more than prescribed to get high, buzzed, or numbed out" (Alonso et al., 2018, p.3). Furthermore, 12-month and lifetime symptoms of attention deficit hyperactivity disorder (ADHD) were assessed with the World Health Organization Adult ADHD Self-Report Scale (ASRS) (Kessler, Adler, et al., 2005). Caseness for CMDs was determined using the procedure validated in the Army Study to Assess Risk and Resilience in Service Members (Army STARRS) (Ursano et al., 2014), which was also used in the WHO World Mental Health Surveys. Comorbidity was assessed by creating dummy variables for the categories (1) "exactly one mental disorder", (2) "exactly two mental disorders", and (3) "three or more mental disorders".

3. *Role impairment.* Health-related role impairment during the past 12 months was assessed using a modified version of the Sheehan Disability Scale (SDS) (Sheehan, 1983; Sheehan et al., 1996). The original SDS consists of three items assessing "work/studies", "social life/leisure activities", and "family life/home responsibilities" (K. H. Sheehan & Sheehan, 2008, p. 71). Like the WHO WMH Surveys (Kessler & Üstün, 2004), the WHO WMH-ICS (Alonso et al., 2018) used an expanded version of the SDS that contains four items asking respondents to rate, on a 0-10 visual analogue scale, how much their mental health problems interfered with their "home management", "work", "close relationships" and "social life". Examples for home management given in the survey were "cleaning, shopping, and working around the house, apartment or yard". Academic and other work was defined as "the ability to work as well as most other people". Close personal relationships were defined as "the ability to form and maintain close relationships with other people". Finally, social life was left unspecified. The SDS was originally developed to assess impairment specifically in mental disorders (Sheehan & Sheehan, 2008), but in the WMH Surveys it was also used to assess the impairment associated with physical conditions so as to make comparisons. The WMH-ICS surveys, on the other hand, did not differentiate between physical and mental health; students were asked to rate the impairment caused by issues with their physical *or* mental health (Alonso et al., 2018). Role impairment scores in the WMH-ICS therefore reflect a global score of physical and mental health-related impairment. The scale was labelled no interference (0), mild (1–3), moderate (4–6), severe (7– 9), and very severe (10). Consistent with other studies in the WHO World Mental Health Surveys and the WHO WMH-ICS (Alonso et al., 2018; Kessler & Üstün, 2004; Vilagut et al., 2018; Wittchen, Nelson, & Lachner, 1998), "severe role

impairment" was defined as having a self-rated impairment score of 7-10 in any of the domains of functioning that were assessed.

Data analysis

Analyses were performed in IBM SPSS Statistics (version 26). Data were checked, cleaned and weighted using the post-stratification weighting technique (Holt & Smith, 1979) to ensure the sample was representative of the total first-year student population in 2015 and 2017, and to compensate for the fact that self-identified White and female students were oversampled. The data were then summarised using descriptive statistics. All of the variables were tested for multicollinearity before further analyses were done. Bivariate statistical analysis was used to establish which sociodemographic and mental health variables were significantly associated with severe role impairment. Multivariable logistic regression models were then used to determine which variables identified as significant in the bivariate analysis were the best independent predictors of severe role impairment. This analysis was done separately for (1) role impairment and selected sociodemographic factors, (2) role impairment and CMDs, and (3) role impairment and the number of CMDs (comorbidity). In addition, the sociodemographic variables were analysed for interactive effects (e.g. Gender x First generation, Population group x First generation and Age x First generation) in each of the domains of role impairment that were assessed (e.g. home management and university-related work). Interactive effects that emerged as significant in the initial analyses (e.g. Population group x First generation) were analysed further by creating more specific dummy variables (in this example, self-identified Black first generation, self-identified Black non-first generation, self-identified White first generation and self-identified White non-first generation). The associations between these dummy variables and severe role impairment were then analysed. The variables that emerged as significant from the above analyses were included in the final

model, which was used to examine the associations between severe role impairment and CMDs, and severe role impairment and selected sociodemographic variables.

Ethical considerations

Ethical approval for the study was obtained from the SUN Health Research Ethics Committee (Ethics Reference #: N13/10/149) (see Appendix A). Institutional permission for the study was obtained from the University's Institutional Research and Planning Division (see Appendix B). The students' informed consent was obtained electronically (see Appendix C). The data was recorded and stored in a way that protected the students' privacy and confidentiality. Students were provided with the relevant contact numbers in case they had concerns or questions regarding the survey, or if they required counselling or other assistance.

Chapter 4: Results

In this chapter, the results of the study are presented. First, the sample characteristics are presented. Next, the analysis of associations between severe role impairment, and selected sociodemographic and mental health factors is presented. This includes the analyses of factors associated with each of the four dimensions of role impairment (i.e. home management, university-related work, close relationships and social life). The chapter concludes with findings concerning comorbidity and role impairment.

Sample characteristics

The sample consisted of 1402 students. As shown in Table 2, the sample consisted predominantly of students under 21 years old (92.3%; 95% CI = 90.8-93.6), students who self-identified as female (55.2%; 95% CI = 52.6-57.8), students who self-identified as White (58.6%; 95% CI = 56.0 - 61.2), and heterosexual students (77.8%; 95% CI = 75.5-80.0).

The 12-month prevalence of having at least one CMD was 42.7% (95% CI = 40.1-45.3). The most prevalent disorders were ADHD (25.9%; 95% CI = 23.6-28.3), GAD (20.8%; 95% CI = 18.7-23.0) and MDD (13.6%; 95% CI = 11.9 - 15.5). Most students with 12-month CMDs had only one disorder (23.6%; 95% CI = 21.4-25.9), but almost the same percentage of students reported at least one comorbid disorder (19.2%; 95% CI = 17.2-21.4).

The 12-month prevalence of any severe role impairment was 25.7% (95% CI = 23.4 - 28.1). The prevalence of severe role impairment in the different role categories is reported in Table 3 below. An independent samples t-test showed that severe role impairment in at least one of the domains (hereafter referred to as “severe role impairment”) was significantly more prevalent among students with 12-month CMDs than among students without 12-month CMDs (42.2%; 95% CI = 39.6-44.8 vs. 13.3%; 95% CI = 11.6-15.2, $p < 0.01$).

Among students without 12-month CMDs, the prevalence rates of severe impairment in the roles that were assessed were: 10.2% in home management (95%CI = 8.7-11.9), 6.1% in university-related work (95%CI = 4.9-7.5), 7.5% in close relationships (95%CI = 6.2-9.0), and 6.4% in social life (95%CI = 5.2-7.8). Even though there was a lot of overlap between the confidence intervals above, the rate of severe impairment in home management was clearly higher than the rates of severe impairment in social life and university-related work.

Students with at least one 12-month CMD had the highest rates of severe impairment in the social domains (close relationships: 25.6%, 95% CI = 23.3-28.0; followed by severe impairment in social life: 24.6%, 95% CI = 22.4-26.9) and home management (23.1%; 95% CI = 20.9-25.4). Having taken the overlap in the confidence intervals of the results into account, the lowest rate of severe impairment was clearly observed in university-related work (18.0%; 95% CI = 16.0-20.1).

Table 2: Sample characteristics

	% (95%CI)[1]
Sociodemographic characteristics	
Gender (self-identified female)	55.2% (52.6 - 57.8)
Population group (self-identified Black)	41.4% (38.8 - 44.0)
Age (under 21)	92.3% (90.8 - 93.6)

First-generation students	19.7% (17.7 - 21.9)
Minority sexual orientation	22.2% (20.1 - 24.5)
Disability	18.4% (16.4 - 20.5)
12-month prevalence of CMDs	
Major depressive disorder	13.6% (11.9 - 15.5)
General anxiety disorder	20.8% (18.7 - 23.0)
Bipolar disorder	1% (0.6 - 1.7)
Alcohol use disorder	5.6% (4.5 - 6.9)
Drug use disorder	3.1% (2.3 - 4.2)
Attention deficit hyperactivity disorder	25.9%

	(23.6 - 28.3)
Any 12-month mental disorder	42.7% (40.1 - 45.3)
Exactly one disorder	23.6% (21.4 - 25.9)
Exactly two disorders	12.3% (10.6 - 14.1)
Three or more disorders	6.9% (5.6 - 8.4)

[1]95%CI: 95% confidence interval

Table 3: Prevalence of severe role impairment

	% (95%CI)[1]
Any severe role impairment	25.7% (23.4 - 28.1)
Severe impairment in home management	16.2% (14.3 - 18.2)
Severe impairment in University-related work	11.2% (9.6 - 13.0)

Severe impairment in close relationships	15.3% (13.5 - 17.3)
Severe impairment in social life	14.2% (12.4 - 16.1)

[1]95%CI: 95% confidence interval

Factors associated with severe role impairment

In this section, I present the analysis of factors associated with severe role impairment in at least one of the domains that were assessed (i.e. home life, work, close relationships or social life). In the first step of the analysis, I identified the sociodemographic factors that are associated with severe role impairment, using bivariate and multiple regression analysis to investigate all main effects and 2X2 interaction effects. In the second step, I explored associations between severe role impairment and CMDs, using bivariate and multiple regression analysis. In the final step, I used the results of the preceding analysis to identify the best-fitting combination of sociodemographic factors and CMDs as predictors of severe role impairment.

Sociodemographic factors associated with severe role impairment

The bivariate and multiple regression analyses of associations between sociodemographic factors and severe role impairment, are shown in Table 4. In the bivariate analysis, all of the sociodemographic variables were significantly associated with severe role impairment, except gender. In the multivariate analysis, population group (aOR = 1.41; 95% CI = 1.08-1.84) and minority sexual orientation (aOR = 1.88, 95% CI = 1.41-2.51) remained

significantly associated with severe role impairment. All 2 X 2 interactions between sociodemographic variables were investigated, but none of them were significant (see appendix D for the results of the analysis of joint effects).

Table 4: Bivariate and multiple regression analysis of associations between sociodemographic variables and severe role impairment

	Predictor distribution (95%CI)	**OR[1] (95%CI)**	**aOR[2] (95%CI)**
Gender (female)	55.2% (52.6 - 57.8)	1.16 (0.91-1.48)	1.15 (0.89-1.48)
Population group (self-identified Black)	41.4% (38.8 - 44.0)	1.65** (1.29-2.11)	1.41* (1.08-1.84)
Age (under 21 years)	92.3% (90.8 - 93.6)	0.65* (0.43-0.99)	0.72 (0.46-1.11)
First-generation student	19.7% (17.7 - 21.9)	1.78** (1.33-2.38)	1.27 (0.92-1.75)
Minority sexual orientation	22.2% (20.1 - 24.5)	2.12** (1.61-2.79)	1.88** (1.41-2.51)

Disability	18.4% (16.4 - 20.5)	1,36* (1.01-1.84)	1.35 (0.99-1.85)

[1] Bivariate analysis

[2] Multiple regression analysis

OR: odds ratios

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

**p<0.01

CMDs associated with severe role impairment

The bivariate and multiple regression analyses of associations between CMDs and severe role impairment are shown in Tables 5 and 6 below. All CMDs, except AUD, were significantly associated with severe role impairment. These associations were maintained even when controlling for the number of disorders, as can be seen in Table 6.

Table 5: Bivariate and multiple regression analysis of associations between CMDs and severe role impairment

	Predictor distribution (95%CI)	**OR[1] (95%CI)**	**aOR[2] (95%CI)**
Major depressive disorder	13.6% (11.9-15.5)	3.67** (2.67-5.06)	2.02** (1.41-2.90)
	20.8%	5.20**	3.25**

Generalised anxiety disorder	(18.7-23.0)	(3.93-6.88)	(2.37-4.45)
Bipolar disorder	1.0% (0.6-1.7)	7.42** (2.31-3.81)	3.77* (1.01-14.06)
Alcohol use disorder	5.6% (4.5-6.9)	1.13 (0.67-1.91)	0.80 (0.44-1.43)
Drug use disorder	3.1% (2.3-4.2)	5.20** (2.77-9.78)	3.45** (1.69-7.02)
Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	3.31** (2.55-4.31)	1.98** (1.47-2.66)
			R^2=0.197 $X^2(6)$ = 195.172 p=0.000

[1] Bivariate analysis

[2] Multiple regression analysis

OR: odds ratios

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

**p<0.01

Table 6: Multiple regression analysis of associations between CMDs and severe role impairment, controlling for the number of disorders

	Predictor distribution (95%CI)	**aOR[2] (95% CI)**
Major depressive disorder	13.6% (11.9-15.5)	3.44** (2.14-5.52)
Generalised anxiety disorder	20.8% (18.7-23.0)	5.40** (3.49-8.36)
Bipolar disorder	1.0% (0.6-1.7)	7.05** (1.79-27.82)
Alcohol use disorder	5.6% (4.5-6.9)	1.2 (0.64-2.27)
Drug use disorder	3.1% (2.3-4.2)	6.07** (2.76-13.35)
	25.9%	2.93**

Attention deficit hyperactivity disorder	(23.6-28.3)	(2.02-4.25)
Exactly two mental disorders	12.3% (10.6-14.1)	0.40** (0.22-0.73)
Three or more mental disorders	6.9% (5.6-8.4)	0.21** (0.08-0.54)
		$R^2 = 0.207$ X^2 (8) = 206.041 p = 0.000

aOR: adjusted odds ratios

95% CI: 95% confidence interval

* p<0.05

** p<0.01

Sociodemographic and mental health factors associated with severe role impairment

The results of the preceding analysis (i.e. tables 4, 5 and 6), were used to determine the best-fitting model of sociodemographic and mental health factors associated with severe role impairment. As shown in Table 7 below, all CMDs, except AUD, were significantly

associated with severe role impairment. The disorders that had the strongest associations with severe role impairment were BP (aOR = 7.00; 95% CI = 1.70-28.91), DUD (aOR = 6.20; 95% CI = 2.77-13.88), and GAD (aOR = 5.60; 95% CI = 3.59-8.74). Population group (self-identified Black) (OR = 1.59; 95%CI = 1.21-2.09) and minority sexual orientation (OR = 1.65; 95% CI = 1.21-2.25) were the only sociodemographic variables that were significantly associated with severe role impairment.

Table 7: Multiple regression analysis: sociodemographic and mental health predictors of severe role impairment (final model)

	Predictor distribution 95% CI	**Any severe role impairment aOR (95% CI)**
Population group (self-identified Black)	41.4% (38.8-44.0)	1.59** (1.21-2.09)
Minority sexual orientation	22.2% (20.1-24.5)	1.65** (1.21-2.25)
Major depressive disorder	13.6% (11.9-5.5)	3.31** (2.05-5.36)
General anxiety disorder	20.8% (18.7-23.0)	5.60** (3.59-8.74)

Bipolar disorder	1% (0.6-1.7)	7.00** (1.70-28.91)
Alcohol use disorder	5.6% (4.5-7.0)	1.26 (0.66-2.39)
Drug use disorder	3.1% (2.3-4.2)	6.20** (2.77-13.88)
Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	2.77** (1.90-4.03)
Exactly two disorders	12.3% (10.6-14.1)	0.40** (0.21-0.73)
Three or more disorders	6.9% (5.6-8.4)	0.20** (0.08-0.54)
		$R^2 = 0.229$
		X^2 (10) = 230.444
		p = 0.000

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Factors associated with severe impairment in home management

In this section, I present the analysis of the sociodemographic and mental health factors associated with severe impairment in home management in order to identify the best-fitting model.

Sociodemographic factors associated with severe impairment in home management

The bivariate and multiple regression analyses of associations between sociodemographic variables and severe impairment in home management are shown in Table 8 below. In the bivariate analysis, first-generation student status (OR = 1.76; 95% CI = 1.15-2.69) and minority sexual orientation (OR = 1.95; 95% CI = 1.27-2.98) were significantly associated with severe impairment in home management. In the multiple regression analysis, only minority sexual orientation (aOR = 1.69; 95% CI = 1.06-2.70) remained significantly associated with severe impairment in home management.

A significant interaction was observed between self-identifying as Black, and first-generation student status (aOR = 5.80; 95% CI = 1.26-26.65) (see Appendix D). Age (aOR = 0.20; 95% CI = 0.04-0.90) also emerged as a significant predictor when 2X2 interactions were taken into account. The interaction between population group (self-identified Black) and first-generation status was investigated further (see Appendix E), but no particular subgroup within the interaction was significantly associated with severe impairment in home management.

Table 8: Bivariate and multiple regression analysis of associations between sociodemographic variables and severe impairment in home management

	Predictor distribution (95%CI)	**OR[1] (95% CI)**	**aOR[2] (95% CI)**
Gender (female)	55.2% (52.6 - 57.8)	0.86 (0.58-1.29)	0.89 (0.59-1.34)
Population group (self-identified Black)	41.4% (38.8 - 44.0)	1.43 (0.95-2.14)	1.22 (0.78-1.90
Age (under 21 years)	92.3% (90.8 - 93.6)	0.67 (0.34-1.31)	0.80 (0.40-1.59)
First-generation student	19.7% (17.7 - 21.9)	1.76** (1.15-2.69)	1.26 (0.76-2.10)
Minority sexual orientation	22.2% (20.1 - 24.5)	1.95** (1.27-2.98)	1.69* (1.06-2.70)

Disability	18.4% (16.4 - 20.5)	1,00 (0.61-1.64)	1.05 (0.64-1.74)

[1] Bivariate analysis

[2] Multiple regression analysis

OR: odds ratios

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

CMDs associated with severe impairment in home management

The bivariate and multiple regression analyses of associations between CMDs and severe impairment in home management are shown in Tables 9 and 10 below. In the bivariate analysis, all of the disorders were significantly associated with severe impairment in home management, except MDD (OR = 1.60; 95% CI = 0.90-2.82) and AUD (OR = 1.92; 95% CI = 0.94-3.95). In the multivariate analysis, ADHD was no longer significantly associated with severe impairment in home management (Table 9), but the association became significant again when controlling for the number of disorders (Table 10).

Table 9: Bivariate and multiple regression analysis of associations between CMDs and severe impairment in home management

Predictor	**Predictor distribution (95%CI)**	**OR[1] (95%CI)**	**aOR[2] (95%CI)**
	13.6%	1.60	1.00

Major depressive disorder	(11.9-15.5)	(0.90-2.82)	(0.53-1.89)
Generalised anxiety disorder	20.8% (18.7-23.0)	2.83** (1.85-4.31)	2.07** (1.26-3.43)
Bipolar disorder	1.0% (0.6-1.7)	50.45** (6.32-402.44)	24.97** (3.38-184.82)
Alcohol use disorder	5.6% (4.5-6.9)	1.92 (0.94-3.95)	1.14 (0.49-2.65)
Drug use disorder	3.1% (2.3-4.2)	4.21** (2.04-8.66)	2.75* (1.21-6.26)
Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	2.52** (1.67-3.79)	1.53 (0.95-2.46)
			R^2=0.127 $X^2(6)$ = 53.972 p=0.000

[1] Bivariate analysis

[2] Multiple regression analysis

OR: odds ratios

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Table 10: Multiple regression analysis of associations between CMDs and severe impairment in home management, controlling for the number of disorders

	Predictor distribution (95%CI)	**aOR (95% CI)**
Major depressive disorder	13.6% (11.9-15.5)	1.40 (0.60-3.30)
Generalised anxiety disorder	20.8% (18.7-23.0)	3.05** (1.53-6.11)
Bipolar disorder	1.0% (0.6-1.7)	36.93** (4.46-305.62)
	5.6%	1.49

Alcohol use disorder	(4.5-6.9)	(0.59-3.76)
Drug use disorder	3.1% (2.3-4.2)	3.98** (1.46-10.82)
Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	2.02* (1.12-3.66)
Exactly two disorders	12.3% (10.6-14.1)	0.48 (0.19-1.24)
Three or more disorders	6.9% (5.6-8.4)	0.36 (0.08-1.67)
		$R^2 = 0.132$
		X^2 (8) = 56.297
		p = 0.000

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Sociodemographic and mental health factors associated with severe impairment in home management

The results of the preceding analysis (i.e. tables 8, 9 and 10), were used to determine the best-fitting model of sociodemographic and mental health predictors of severe impairment in home management. As shown in Table 11 below, MDD and AUD were not significantly associated with severe impairment in home management. The disorders with the strongest associations with severe impairment in home management were BP (aOR = 35.27; 95% CI = 4.22-294.86), DUD (aOR = 3.60; 95% CI = 1.31-9.88), and GAD (aOR = 2.91; 95% CI = 2.91; 95% CI = 1.45-5.84). Sexual orientation was the only sociodemographic variable that was significantly associated with severe impairment in home management (aOR = 1.59; 95% CI = 1.00-2.52).

Table 11: Multiple regression analysis: sociodemographic and mental health predictors of severe impairment in home management (final model)

	Predictor distribution 95% CI	**Home management aOR (95% CI)**
Age	92.3% (90.8-93.6)	0.86 (0.41-1.81)
Minority sexual orientation	22.2% (20.1-24.5)	1.59* (1.00-2.52)
	13.6%	1.35

Major depressive disorder	(11.9-5.5)	(0.58-3.18)
General anxiety disorder	20.8% (18.7-23.0)	2.91** (1.45-5.84)
Bipolar disorder	1% (0.6-1.7)	35.27** (4.22-294.86)
Alcohol use disorder	5.6% (4.5-7.0)	1.60 (0.63-4.04)
Drug use disorder	3.1% (2.3-4.2)	3.60* (1.31-9.88)
Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	1.91* (1.05-3.48)
Exactly two disorders	12.3% (10.6-14.1)	0.512 (0.20-1.32)
Three or more disorders	6.9% (5.6-8.4)	0.38 (0.08-1.79)
		$R^2 = 0.141$

X^2 (10) = 60.468

p = 0.000

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aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Factors associated with severe impairment in university-related work

In this section, I present the analysis of the sociodemographic and mental health factors associated with severe impairment in university-related work in order to identify the best-fitting model.

Sociodemographic factors associated with severe impairment in university-related work

The bivariate and multiple regression analyses of associations between sociodemographic factors and severe impairment in university-related work are shown in Table 12. In the bivariate analysis, population group (self-identified Black) (OR = 1.44; 95% CI = 1.03-2.02), age (under 21 years) (OR = 0.58; 95% CI = 0.34-0.99), and minority sexual orientation (OR = 1.96; 95% CI = 1.37-2.82) were significantly associated with severe impairment in university-related work. In the multiple regression analysis, only sexual orientation remained significantly associated with severe impairment in university-related work (aOR = 1.94; 95% CI = 1.32-2.84). All 2 X 2 interactions between sociodemographic variables were investigated, but none of them were significant (see appendix D).

Table 12: Bivariate and multiple regression analysis of associations between sociodemographic variables and severe impairment in university-related work

	Predictor distribution (95%CI)	**OR[1] (95% CI)**	**aOR[2] (95% CI)**
Gender (female)	55.2% (52.6 - 57.8)	1.27 (0.90-1.79)	1.28 (0.90-1.82)
Population group (self-identified Black)	41.4% (38.8 - 44.0)	1.44* (1.03-2.02)	1.32 (0.92-1.89)
Age (under 21 years)	92.3% (90.8 - 93.6)	0.58* (0.34-0.99)	0.59 (0.34-1.02)
First-generation student	19.7% (17.7 - 21.9)	1.33 (0.90-1.98)	0.92 (0.59-1.43)
Minority sexual orientation	22.2% (20.1 - 24.5)	1.96** (1.37-2.82)	1.94** (1.32-2.84)
Disability	18.4% (16.4 - 20.5)	1.24 (0.82-1.86)	1.21 (0.80-1.85)

[1] Bivariate analysis

[2] Multiple regression analysis

OR: odds ratios

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

CMDs associated with severe impairment in university-related work

The bivariate and multiple regression analyses of associations between CMDs and severe impairment in university-related work are shown in Tables 13 and 14 below. In the bivariate analysis, all of the CMDs were significantly associated with severe impairment in university-related work, except BP (OR = 2.41; 95% CI = 0.65-8.84) and AUD (OR = 1.50; 95% CI = 0.79-2.85) (see Table 13). This remained true in the multivariate analyses, including the model where the number of disorders was controlled for (see Tables 13 and 14).

Table 13: Bivariate and multiple regression analysis of associations between CMDs and severe impairment in university-related work

	Predictor distribution 95% CI	**OR[1] (95%CI)**	**aOR[2] (95%CI)**
Major depressive disorder	13.6% (11.9-15.5)	3.42** (2.32-5.03)	2.06** (1.34-3.17)
	20.8%	3.70**	2.31**

Generalised anxiety disorder	(18.7-23.0)	(2.61-5.24)	(1.54-3.46)
Bipolar disorder	1.0% (0.6-1.7)	2.41 (0.65-8.84)	1.24 (0.31-4.86)
Alcohol use disorder	5.6% (4.5-6.9)	1.50 (0.79-2.85)	1.14 (0.57-2.29)
Drug use disorder	3.1% (2.3-4.2)	3.66** (1.87-7.18)	2.16* (1.03-4.53)
Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	2.72** (1.93-3.84)	1.72** (1.17-2.52)
			R^2=0.107 $X^2(6)$ = 76.416 p=0.000

[1] Bivariate analysis

[2] Multiple regression analysis

OR: odds ratios

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Table 14: Multiple regression analysis of associations between CMDs and severe impairment in university-related work, controlling for the number of disorders

	Predictor distribution 95% CI	**aOR (95% CI)**
Major depressive disorder	13.6% (11.9-15.5)	2.39** (1.30-4.40)
Generalised anxiety disorder	20.8% (18.7-23.0)	2.64** (1.49-4.70)
Bipolar disorder	1.0% (0.6-1.7)	1.41 (0.34-5.91)
Alcohol use disorder	5.6% (4.5-6.9)	1.26 (0.59-2.69)
Drug use disorder	3.1% (2.3-4.2)	2.48* (1.07-5.74)

Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	1.93* (1.16-3.21)
Exactly two disorders	12.3% (10.6-14.1)	0.8 (0.36-1.74)
Three or more disorders	6.9% (5.6-8.4)	0.65 (0.19-2.24)
		$R^2 = 0.108$
		X^2 (8) = 76.879
		p = 0.000

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Sociodemographic and mental health factors associated with severe impairment in university-related work

The results of the preceding analysis (i.e. tables 12, 13 and 14), were used to determine the best-fitting model of sociodemographic and mental health predictors of severe

impairment in university-related work. As shown in Table 15 below, the only disorders that were significantly associated with severe impairment in university-related work were GAD (aOR = 2.53; 95% CI = 1.42-4.50), MDD (aOR = 2.29; 95% CI = 1.24-4.22), and ADHD (aOR = 1.85; 95% CI = 1.11-3.08). Sexual orientation was the only sociodemographic variable that was associated with severe impairment in university-related work (aOR = 1.66; 95% CI = 1.14-2.44).

Table 15: Multiple regression analysis: sociodemographic and mental health predictors of severe impairment in university-related work (final model)

	Predictor distribution 95% CI	**University-related work aOR (95% CI)**
Minority sexual orientation	22.2% (20.1-24.5)	1.66** (1.14-2.44)
Major depressive disorder	13.6% (11.9-5.5)	2.29** (1.24-4.22)
General anxiety disorder	20.8% (18.7-23.0)	2.53** (1.42-4.50)
Bipolar disorder	1% (0.6-1.7)	1.22 (0.29-5.21)

Alcohol use disorder	5.6% (4.5-7.0)	1.28 (0.60-2.72)
Drug use disorder	3.1% (2.3-4.2)	2.20 (0.94-5.16)
Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	1.85* (1.11-3.08)
Exactly two disorders	12.3% (10.6-14.1)	0.85 (0.38-1.86)
Three or more disorders	6.9% (5.6-8.4)	0.70 (0.20-2.42)
		$R^2 = 0.117$
		X^2 (9) = 83.438
		p = 0.000

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* $p<0.05$

** $p<0.01$

Factors associated with severe impairment in close relationships

In this section, I present the analysis of the sociodemographic and mental health factors associated with severe impairment in close relationships in order to identify the best-fitting model.

Sociodemographic factors associated with severe impairment in close relationships

The bivariate and multiple regression analyses of associations between sociodemographic factors and severe impairment in close relationships are shown in Table 16 below. In the bivariate analysis, population group (self-identified Black) (OR = 1.52; 95% CI = 1.13-2.04), first-generation student status (OR = 1.64; 95% CI = 1.17-2.30), and sexual minority status (OR = 1.76; 95% CI = 1.27-2.43) were significantly associated with severe impairment in close relationships. In the multiple regression analysis, only the association between sexual orientation and severe impairment in close relationships remained significant (aOR = 1.59; 95% CI = 1.13-2.24).

An interaction between gender and sexual orientation was found to be predictive of severe impairment in close relationships (aOR = 2.45; 95% CI = 1.18-5.08) (see Appendix D). When this interaction was investigated further, the association between lesbianism and severe impairment in close relationships was found to be significant (aOR = 2.52; 95% CI = 1.63-3.90) (see Appendix F).

Table 16: Bivariate and multiple regression analysis of associations between sociodemographic variables and severe impairment in close relationships

	Predictor distribution (95%CI)	**OR[1] (95% CI)**	**aOR[2] (95% CI)**
Gender (female)	55.2% (52.6 - 57.8)	1.30 (0.96-1.76)	1.30 (0.96-1.77)
Population group (self-identified Black)	41.4% (38.8 - 44.0)	1.52** (1.13-2.04)	1.32 (0.96-1.81)
Age (under 21 years)	92.3% (90.8 - 93.6)	0.70 (0.42-1.16)	0.73 (0.44-1.22)
First-generation student	19.7% (17.7 - 21.9)	1.64** (1.17-2.30)	1.24 (0.85-1.82)
Minority sexual orientation	22.2% (20.1 - 24.5)	1.76** (1.27-2.43)	1.59** (1.13-2.24)

Disability	18.4% (16.4 - 20.5)	1.21 (0.84-1.75)	1.17 (0.81-1.70)

[1] Bivariate analysis

[2] Multiple regression analysis

OR: odds ratios

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

CMDs associated with severe impairment in close relationships

The bivariate and multiple regression analyses of associations between CMDs and severe impairment in close relationships are shown in Tables 17 and 18 below. In the bivariate analysis, all of the CMDs were significantly associated with severe impairment in close relationships, except AUD (OR = 1.15; 95% CI = 0.62 - 2.13). This remained true in the multivariate analyses, also when the number of disorders was controlled for (see Tables 17 and 18).

Table 17: Bivariate and multiple regression analysis of associations between CMDs and severe impairment in close relationships

	Predictor distribution (95%CI)	**OR[1] (95%CI)**	**aOR[2] (95%CI)**
	13.6%	3.28**	1.95**

Major depressive disorder	(11.9-15.5)	(2.31-4.67)	(1.31-2.89)
Generalised anxiety disorder	20.8% (18.7-23.0)	4.33** (3.17-5.92)	2.85** (1.99-4.08)
Bipolar disorder	1.0% (0.6-1.7)	7.62** (2.62-22.20)	4.28* (1.27-14.40)
Alcohol use disorder	5.6% (4.5-6.9)	1.15 (0.62-2.13)	0.79 (0.40-1.57)
Drug use disorder	3.1% (2.3-4.2)	5.20** (2.80-9.66)	3.38** (1.69-6.77)
Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	2.59** (1.91-3.51)	1.46* (1.03-2.06)
			R^2=0.142
			$X^2(6) = 117.047$
			p=0.000

[1] Bivariate analysis

[2] Multiple regression analysis

OR: odds ratios

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Table 18: Multiple regression analysis of associations between CMDs and severe impairment in close relationships, controlling for the number of disorders

	Predictor distribution 95% CI	**Close relationships aOR (95% CI)**
Major depressive disorder	13.6% (11.9-15.5)	2.90** (1.69-4.99)
Generalised anxiety disorder	20.8% (18.7-23.0)	3.89** (2.37-6.40)
Bipolar disorder	1.0% (0.6-1.7)	6.48** (1.80-23.36)
	5.6%	1.04

Alcohol use disorder	(4.5-6.9)	(0.50-2.17)
Drug use disorder	3.1% (2.3-4.2)	4.91** (2.24-10.76)
Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	1.97** (1.25-3.11)
Exactly two disorders	12.3% (10.6-14.1)	0.61 (0.30-1.22)
Three or more disorders	6.9% (5.6-8.4)	0.32* (0.11-0.96)
		$R^2 = 0.147$
		X^2 (8) = 121.272
		p = 0.000

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Sociodemographic and mental health factors associated with severe impairment in close relationships

The results of the preceding analysis (i.e. tables 16, 17 and 18), were used to determine the best-fitting model of sociodemographic and mental health predictors of severe impairment in close relationships. As shown in Table 19 below, AUD was the only disorder that was not significantly associated with severe impairment in close relationships. The disorders that had the strongest associations with severe impairment in close relationships were BP (aOR = 6.37; 95% CI = 1.75-23.18), DUD (aOR = 4.58; 95% CI = 2.07-10.13), and GAD (aOR = 3.75; 95% CI = 2.27-6.18). Lesbianism was the only sociodemographic factor that was significantly associated with severe impairment in close relationships (aOR = 1.73; 95% CI = 1.14-2.62).

Table 19: Multiple regression analysis: sociodemographic and mental health predictors of severe impairment in close relationships (final model)

	Predictor distribution 95% CI	**Close relationships aOR (95% CI)**
Female minority sexual orientation	11.7% (10.1-13.5)	1.73* (1.14-2.62)
Major depressive disorder	13.6% (11.9-5.5)	2.77** (1.60-4.77)
	20.8%	3.75**

General anxiety disorder	(18.7-23.0)	(2.27-6.18)
Bipolar disorder	1% (0.6-1.7)	6.37** (1.75-23.18)
Alcohol use disorder	5.6% (4.5-7.0)	1.05 (0.50-2.19)
Drug use disorder	3.1% (2.3-4.2)	4.58** (2.07-10.13)
Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	1.89** (1.19-3.00)
Exactly two disorders	12.3% (10.6-14.1)	0.63 (0.31-1.27)
Three or more disorders	6.9% (5.6-8.4)	0.33 (0.11-1.00)
		$R^2 = 0.154$
		X^2 (9) = 127.519
		p = 0.000

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Factors associated with severe impairment in social life

In this section, I present the analysis of the sociodemographic and mental health factors associated with severe impairment in social life in order to identify the best-fitting model.

Sociodemographic factors associated with severe impairment in social life

The bivariate and multiple regression analyses of associations between CMDs and impairment in social life are shown in Table 20 below. In the bivariate analysis, all of the sociodemographic variables were significantly associated with severe impairment in social life, except age (under 21 years) (OR = 0.74; 95% CI = 0.44-1.24). In the multivariate analysis, female gender (aOR = 1.51; 95% CI = 1.10-2.09), sexual minority status (aOR = 1.56; 95% CI = 1.09-2.22), and disability (aOR = 1.45; 95% CI = 1.01-2.10) remained as significant predictors of severe impairment in social life.

A significant interaction was found between first-generation student status and age (aOR = 0.19; 95% CI = 0.05-0.79) (see Appendix D). When this interaction was investigated further, first-generation students (21 years and over) emerged as a significant predictor of severe impairment in social life (aOR = 4.04; 95% CI = 1.40-11.67) (see Appendix G).

Table 20: Bivariate and multiple regression analysis of associations between sociodemographic variables and severe impairment in social life

Predictor distribution (95%CI)	OR[1] (95%CI)	aOR[2] (95%CI)

Gender (female)	55.2% (52.6 - 57.8)	1.54** (1.13-2.11)	1.51* (1.10-2.09)
Population group (self-identified Black)	41.4% (38.8 - 44.0)	1.47* (1.08-1.99)	1.29 (0.93-1.80)
Age (under 21 years)	92.3% (90.8 - 93.6)	0.74 (0.44-1.24)	0.74 (0.43-1.25)
First-generation student	19.7% (17.7 - 21.9)	1.52* (1.07-2.16)	1.18 (0.79-1.75)
Minority sexual orientation	22.2% (20.1 - 24.5)	1.69** (1.20-2.36)	1.56* (1.09-2.22)
Disability	18.4% (16.4 - 20.5)	1.55* (1.08-2.22)	1.45* (1.01-2.10)

[1] Bivariate analysis

[2] Multiple regression analysis

OR: odds ratios

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

CMDs associated with severe impairment in social life

The bivariate and multiple regression analyses of associations between CMDs and severe impairment in social life are shown in Tables 21 and 22 below. In the bivariate analysis, all of the CMDs were significantly associated with severe impairment in social life, except AUD (OR = 1.26; 95% CI = 0.68-2.34) (see Table 21). In the multivariate analyses, DUD was initially not associated with severe impairment in social life (see Table 21), but the association became significant when controlling for the number of disorders (see Table 22).

Table 21: Bivariate and multiple regression analysis of associations between CMDs and severe impairment in social life

	Predictor distribution (95%CI)	**OR[1] (95%CI)**	**aOR[2] (95%CI)**
Major depressive disorder	13.6% (11.9-15.5)	3.38** (2.36-4.84)	2.04** (1.36-3.05)
Generalised anxiety disorder	20.8% (18.7-23.0)	4.35** (3.16-6.00)	2.75** (1.90-3.98)

Bipolar disorder	1.0% (0.6-1.7)	10.08** (3.26-31.15)	6.60** (1.98-22.08)
Alcohol use disorder	5.6% (4.5-6.9)	1.26 (0.68-2.34)	0.91 (0.45-1.81)
Drug use disorder	3.1% (2.3-4.2)	3.08** (1.59-5.93)	1.76 (0.84-3.68)
Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	2.81** (2.06-3.85)	1.62** (1.14-2.32)
			R^2=0.140 $X^2(6)$ = 111.452 p=0.000

[1] Bivariate analysis

[2] Multiple regression analysis

OR: odds ratios

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Table 22: Multiple regression analysis of associations between CMDs and severe impairment in social life, controlling for the number of disorders

	Predictor distribution 95% CI	**aOR (95% CI)**
Major depressive disorder	13.6% (11.9-15.5)	3.74** (2.16-6.47)
Generalised anxiety disorder	20.8% (18.7-23.0)	4.51** (2.70-7.52)
Bipolar disorder	1.0% (0.6-1.7)	12.38** (3.44-44.53)
Alcohol use disorder	5.6% (4.5-6.9)	1.37 (0.65-2.88)
Drug use disorder	3.1% (2.3-4.2)	3.12** (1.35-7.19)
Attention deficit	25.9% (23.6-28.3)	2.57** (1.62-4.08)

hyperactivity disorder		
Exactly two disorders	12.3% (10.6-14.1)	0.47* (0.23-0.94)
Three or more disorders	6.9% (5.6-8.4)	0.17** (0.06-0.53)
		R^2 = 0.151
		X^2 (8) = 120.926
		p = 0.000

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Sociodemographic and mental health factors associated with severe impairment in social life

The results of the preceding analysis (i.e. tables 20, 21 and 22), were used to determine the best-fitting model of sociodemographic and mental health predictors of severe impairment in social life. As shown in Table 23 below, AUD was the only disorder that was not significantly associated with severe impairment in social life. The disorders with the strongest associations with severe impairment in social life were BP (aOR = 10.83; 95% CI =

2.96-39.60), GAD (aOR = 4.29; 95% CI = 2.56-7.20), and MDD (aOR = 3.56; 95% CI = 2.05-6.21). First-generation students (21 years and over), was the only sociodemographic variable that was significantly associated with severe impairment in social life (aOR = 3.01; 95% CI = 1.34-6.72).

Table 23: Multiple regression analysis: sociodemographic and mental health predictors of severe impairment in social life (final model)

	Predictor distribution 95% CI	**Social life aOR (95% CI)**
Gender (self-identified female)	55.2% (52.6-57.8)	1.28 (0.91-1.80)
First-generation students (21 years and over)	2.5% (1.8-3.5)	3.01** (1.34-6.72)
Minority sexual orientation	22.2% (20.1-24.5)	1.26 (0.87-1.82)
Disability	18.4% (16.4-20.5)	1.16 (0.78-1.72)
	13.6%	3.56**

Major depressive disorder	(11.9-5.5)	(2.05-6.21)
General anxiety disorder	20.8% (18.7-23.0)	4.29** (2.56-7.20)
Bipolar disorder	1% (0.6-1.7)	10.83** (2.96-39.60)
Alcohol use disorder	5.6% (4.5-7.0)	1.45 (0.69-3.05)
Drug use disorder	3.1% (2.3-4.2)	2.90* (1.25-6.70)
Attention deficit hyperactivity disorder	25.9% (23.6-28.3)	2.52** (1.58-4.01)
Exactly two disorders	12.3% (10.6-14.1)	0.48* (0.23-0.96)
Three or more disorders	6.9% (5.6-8.4)	0.17** (0.06-0.54)

	$R^2 = 0.165$
	X^2 (12) = 132.277
	p = 0.000

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Comorbid disorders and severe role impairment

Comorbidity was associated with higher odds of severe role impairment in all of the domains that were assessed (see Table 24 below). The effect of additional disorders appears to be subadditive. In other words, students with exactly one disorder were 3.27 times more likely than their peers to have severe role impairment (95% CI = 2.39-4.46), whereas students with exactly two disorders were 5.58 times more likely to have severe role impairment (95% CI = 3.87-8.05). Therefore, the odds of severe role impairment associated with having two disorders was less than twice as large as the odds of severe role impairment associated with having one disorder. This indicates that the additional risk of severe role impairment associated with having a second disorder, was smaller than the risk of severe role impairment associated with having the disorder on its own.

Table 24: Multiple regression analysis: number of CMDs as predictors of severe role impairment

Predictor distribution (95%CI)	**Any severe role impairment**	**Home management**	**University-related**	**Close relationships**	**Social life aOR (95%CI)**

		aOR (95%CI)	**aOR (95%CI)**	**work aOR (95%CI)**	**aOR (95%CI)**	
Exactly one disorder	23.6% (21.4-25.9)	3.27** (2.39-4.46)	1.85* (1.10-3.11)	2.09** (1.34-3.26)	2.83** (1.92-4.15)	3.45** (2.31-5.14)
Exactly two disorders	12.3% (10.6-14.1)	5.58** (3.87-8.05)	2.59** (1.46-4.60)	3.93** (2.45-6.31)	5.06** (3.32-7.73)	5.74** (3.69-8.92)
Three or more disorders	6.9% (5.6-8.4)	12.07** (7.55-19.28)	5.84** (3.13-10.92)	7.95** (4.76-13.30)	8.88** (5.47-14.42)	8.87** (5.36-14.68)
		R^2=.181 $X^2(3)$ = 178.121 p=0.000	R^2=.078 $X^2(3)$ = 32.506 p=0.000	R^2=.100 $X^2(3)$ = 71.089 p=0.000	R^2=.130 $X^2(3)$ = 106.603 p=0.000	R^2=.135 $X^2(3)$ = 107.546 p=0.000

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

** p<0.01

Chapter 5: Discussion

Within an evidence-based, public mental health framework, mental health statistics such as the prevalence of CMDs and role impairment are important indicators of the need for mental healthcare and are therefore central to the planning of services and interventions (Kessler and Üstün, 2004). Previous studies have shown that almost a third of students in South Africa (31.5%) have 12-month CMDs (Bantjes et al., 2019), yet it is unclear what proportion of these students are severely impaired by their disorders. The aim of this study was therefore to examine the role impairment associated with CMDs among first-year university students in South Africa. In the study, only students with 12-month CMDs who are severely impaired by their disorders are deemed to be in need of mental healthcare. It was found that 25.7% of first-year students reported severe role impairment. In line with previous findings, a large number of students reported 12-month CMDs (42.7%), of which more than two fifths were severely impaired (42.2%). This amounts to 18% of the total sample of students who had 12-month CMDs and reported severe role impairment, and for this reason require mental healthcare. The results showed that GAD, MDD and ADHD carried the largest proportion of the need for care when both prevalence and role impairment were taken into account, suggesting that these disorders should be prioritised in intervention efforts with students who have 12-month CMDs. Importantly, a small group of students who did not screen positive for 12-month CMDs also reported severe role impairment (13.3%), which amounts to 7.6% of the total sample. These students need to be taken into account in the planning of services and interventions, seeing that some of them may have mental disorders that were not included in the survey that require care due to the impairment caused. Furthermore, some subgroups of students, such as sexual minority students, self-identified Black students, and older first-generation students, were more likely to suffer from severe role impairment than their peers, independently of CMDs. It may be appropriate to support these subgroups with targeted

outreach and special interventions, with a focus on promoting functioning. In this chapter, the main findings of the study are discussed and the implications are explored.

The need for care in South African universities

It was found that almost a quarter (25.7%) of first-year students reported severe role impairment. The high rates of severe role impairment detected in this study is reminiscent of Brownson's (2010) statement that most counselling centres in the USA operate in a context of high demand relative to limited resources. This is clearly also the case in South African universities. One of the aims of the WMH-ICS is to develop and test effective online interventions, which are less resource-intensive than traditional approaches (Cuijpers et al., 2019a). These interventions may reach large numbers of students in South African universities who report severe role impairment.

The need for mental healthcare in South African universities can be broken down into its constituent parts. A large number of students reported 12-month CMDs (42.7%), of which two fifths reported severe role impairment (42.2%). This amounts to 18% of the total sample of first-year students who are severely impaired and have 12-month CMDs, and therefore require mental healthcare. An additional 13.3% of students without 12-month CMDs reported severe role impairment, which amounts to 7.6% of the total sample of first-year students. Further investigation is needed to determine the source of the impairment that these students report. In the meantime, it is important to take these students into account when estimating the need for care, as some of them may be reporting severe role impairment due to mental disorders that were not included in the survey. It should be kept in mind that some of these students may also be reporting severe role impairment due to physical disorders, as overall health-related impairment was measured in the survey. Finally, some student groups, including self-identified Black students, sexual minority students, and older first-generation

students, had higher odds of severe role impairment than their peers, independently of CMDs. It may be appropriate to support these subgroups with outreach programmes and special interventions that focus on improving functioning.

The findings of the study also indicate the areas of functioning in which first-year students are most impaired, and that interventions may therefore usefully focus on. Studies of role impairment among university students have mostly focused on academic impairment (Bruffaerts et al., 2018; Cuijpers et al., 2019b; Eisenberg, Golberstein, Hunt, et al., 2009; Fauman and Hopkinson, 2010; Grotan, Sund, & Bjerkeset, 2019; Heiligenstein, Guenther, Hsu, & Herman, 1996; Holmes & Silvestri, 2015; Hysenbegasi, Hass, & Rowland, 2005; Keyes et al., 2012a). Academic impairment is also a priority on South African campuses, where 42% of students enrolled in 3-year degrees in 2012 dropped out by 2017, and 35% of students enrolled in 4-year degrees dropped out in the same time period (Council on Higher Education, 2019). In the present study, 6.1% of students without 12-month CMDs, and 18% of students with 12-month CMDs reported severe impairment in university-related work. However, both students with and without CMDs also reported high, and even higher rates of severe impairment in other areas of functioning, namely the social domains of functioning and home management. This finding is likely an indication of the immense pressure that first-year students experience in the transition from school to university, and from adolescence to emerging adulthood, such as large changes in their social relationships, and increased responsibility to look after themselves (Cleary, Walter, & Jackson, 2011; Conley, Kirsch, Dickson, & Bryant, 2014). Students with 12-month CMDs were significantly more impaired than their peers, including in home management and social functioning, which indicates that these students have particular difficulty with adapting in the transition to university and emerging adulthood. Only some students who reported severe role impairment, with and without 12-month CMDs, reported severe impairment in university-related work, but social

functioning and home management are also strongly associated with mental health and academic functioning, and are important contributors to student attrition (Lean et al., 2019; Saris, Aghajani, van der Werff, van der Wee, & Penninx, 2017). It may therefore be important to focus interventions with first-year students on social functioning and home management, in addition to study habits, if the goal is to improve academic functioning and student retention. Online mental health interventions have been shown to be effective in treating the symptoms of CMDs and improving the social and academic functioning of students (Conley, Durlak, Shapiro, Kirsch, & Zahniser, 2016; Davies, Morriss, & Glazebrook, 2014; Harrer et al., 2019). An investment in the interventions developed in the WMH-ICS is therefore likely to bring about an improvement in student functioning, including academic functioning, as well as student retention.

The findings of the study furthermore identify resilience as an important area in which future research may be done to improve the effectiveness of interventions with university students. More than half of first-year students (57.8%) with 12-month CMDs were not severely impaired by their disorders, even during the difficult period of transition to university life and emerging adulthood. There are many possible explanations for this. For instance, some students may already be receiving effective treatments for their disorders, or do not have insight into the impairment associated with their disorders. However, there may also be students who have developed behavioural resilience to the ill effects of their CMDs, such as coping strategies, diet, exercise and sleep, that may protect them from some of the ill effects of mental disorders. Studies that document these sources of resilience may help improve the effectiveness of interventions with university students.

Which CMDs are most impairing?

The most impairing CMDs do not necessarily carry the largest proportion of the need for care, because the need for care depends both on how impairing CMDs are and how prevalent they are (Kessler and Üstün, 2004). Nevertheless, it is also important to know which disorders are most impairing, which can be determined by looking at the strength of the associations between severe role impairment and CMDs without taking the prevalence into account.

The disorders with the strongest associations with severe role impairment were BP (aOR = 7.00; 95% CI = 1.70-28.91), DUD (aOR = 6.20; 95% CI = 2.77-13.88), and GAD (aOR = 5.60; 95% CI = 3.59-8.74). However, the confidence intervals of the associations between severe role impairment and CMDs generally overlapped, which means we cannot say for certain which CMDs were most impairing among first-year students in South Africa. Alonso et al. (2018) do not remark on this, but it was also a limitation of the international study, which had a large sample size (n = 13 984). An even larger sample size will therefore be required to make fully confident estimates of the relative impairment associated with CMDs. It is nevertheless possible to interpret the preliminary findings in the South African data by comparing it to the international data.

A comparison between the results of this study and the results for the international sample suggests that the strong associations between BP, DUD and severe role impairment that were found in the study will most likely be attenuated as the database is updated. BP and DUD were relatively rare disorders, and therefore the sample size available for analyses between these disorders and severe role impairment was limited. The effect of this can be seen in the exceptionally wide confidence intervals obtained for these associations. This indicates that we cannot be confident about what the actual strength of the associations between severe role impairment, and BP and DUD, were in the South African student

population. In contrast, in the international sample, because of the larger sample size, the confidence intervals obtained for BP (aOR = 2.7; 95% CI = 1.9–3.8) and DUD (aOR = 2.1; 95%CI = 1.4–3.0) were much more narrow (Alonso et al., 2018). Furthermore, the more prevalent disorders of MDD (aOR = 4.0; 95%CI = 3.3–4.8) and GAD (aOR = 3.9; 95%CI = 3.1–4.8) were more strongly associated with severe role impairment than BP and DUD. The confidence intervals associated with the odds ratios for CMDs and severe role impairment in the international sample still overlapped with one another, but they were collected in a narrower range, with MDD and GAD consistently having the strongest associations with severe role impairment in all of the categories that were assessed. It is expected that the associations between CMDs and severe role impairment in the South African sample will be adjusted in line with the results for the international sample as the database is updated.

Among first-year students in South Africa, ADHD (25.9%), GAD (20.8%) and MDD (13.6%) were the most prevalent disorders by a large margin. Furthermore, all of these disorders were significantly associated with severe role impairment, at least to an equal degree as other CMDs. Therefore, ADHD, GAD and MDD carry the largest proportion of the need for care among first-year students in South Africa. This indicates that most of the resources that are available for mental health interventions in South African universities should be allocated to these disorders.

Are first-year students in South Africa more impaired than in other countries?

The 12-month prevalence of severe role impairment in this study (25.7%) was higher than the international average of 20.4% (Alonso et al., 2018). Working with the international sample, Alonso et al. (2018) also detected and commented on the higher-than-average prevalence of severe role impairment among South African students. More specifically, the authors found that country membership was a significant predictor of severe role impairment

for some countries, including South Africa. Furthermore, CMDs were controlled for in this analysis, which indicates that the higher rates of severe role impairment were due to reasons other than 12-month CMDs. This was confirmed in the present study. The proportion of students with 12-month CMDs who were severely impaired (42.2%) was similar to the international average of 42.9%, but the proportion of students without 12-month CMDs who were severely impaired (13.3%) was higher than the international average of 10% (Alonso et al., 2018).

It is premature to draw conclusions from these international comparisons, for two reasons. First, Alonso et al. did not report the confidence intervals for the international data above, so there is the possibility that the prevalence rates of CMDs in the South African and the international student population overlapped. Second, the patterns in the data are bound to change for all the countries as the WMH-ICS database is updated. For example, the updated data for South Africa used in the present study consisted of a larger sample size than was available for the international report by Auerbach et al (2018). The prevalence of 12-month CMDs for South Africa reported there (32.2%) is much lower than the level detected in the present study. At the time the international study was published, the data for many other countries were similarly limited (Alonso et al., 2018). Therefore, on an international level, there is still much volatility and uncertainty in the WMH-ICS findings.

The preliminary finding that severe role impairment is more prevalent than average in South African universities is interesting, and will be monitored in the years to come. There are two additional findings that may be related to this finding, and are therefore important to monitor in this context. The first is that, the 12-month prevalence of GAD was higher in South Africa than the international average, while the 12-month prevalence of MDD was markedly lower (Auerbach et al., 2018; Bantjes et al., 2019). The second is the finding that

some marginalised groups on South African campuses were more likely to experience severe role impairment than their peers, independently of CMDs (discussed later in this chapter).

Comorbidity and role impairment

Most students with 12-month CMDs had only one disorder (23.6%), but it was also common for students to have at least one comorbid disorder (19.2%). This corresponds to findings for the international sample, as well as previous research, which has shown that comorbidity is common in mental health (Alonso et al., 2011; Auerbach et al., 2019; Mall et al., 2015).

Comorbid disorders were associated with higher odds of severe impairment in all of the domains that were assessed, with additional disorders having a subadditive effect on severe role impairment. In other words, the more disorders students had, the higher their risk of severe role impairment. However, each additional disorder was associated with a smaller risk of severe role impairment than the risk associated with having the disorder on its own. This subadditive effect is detected by comparing the odds of severe role impairment associated with having one disorder (aOR = 3.27; 95% CI = 2.39-4.46) to the odds of severe role impairment associated with exactly two disorders (aOR = 5.58; 95% CI = 3.87-8.05) to see whether the difference between them is more, or less than double. The fact that the confidence intervals for these results overlapped casts doubt on the finding of a subadditive effect. Nevertheless, the subadditive effect is a general feature of comorbidity that was also found in the international WMH-ICS sample (Alonso et al., 2018), as well as in the Spanish sample (Ballester et al., 2020), and has been replicated in other studies (Alonso et al., 2011; Bruffaerts et al., 2012). The subadditive association between CMDs and severe role impairment that was detected in the present study is therefore most likely real.

Why was AUD not associated with severe role impairment?

The results show that AUD, unlike other less prevalent disorders such as BP and DUD, was not a significant predictor of severe impairment in any of the categories of functioning that were studied, including in the bivariate analysis. This was most likely due to a combination of the sample size available for the analysis and the magnitude of the associations between AUD and severe role impairment. The prevalence of AUD was 5.6%, which amounts to a meagre 79 participants out of the total sample of 1402. It is also a general trend in the literature that the associations between AUD and severe role impairment are weaker than for other CMDs, even when using larger sample sizes than in the present study (Alonso et al., 2018; Bruffaerts et al., 2012). While it is possible this shows that AUD really is less impairing than other CMDs, there is reason to suspect that the impairment associated with AUD is underreported and not readily recognised by research participants, especially university students (Blanco et al., 2008; Heshmat, 2018).

Significant associations between AUD and severe role impairment will most likely be found in the South African sample as the database is updated over the coming years. In the international sample, AUD had the weakest association with any severe role impairment of the disorders that were studied (aOR = 1.7; 95% CI = 1.3–2.2), but the association was still significant and sizeable, and the confidence interval overlapped with the results of some other disorders, including BP (aOR = 2.7; 95% CI = 1.9–3.8) and DUD (aOR = 2.1; 95% CI = 1.3–2.2). The confidence interval for the association between AUD and severe role impairment in the present study (aOR = 1.26; 95% CI = 0.66-2.39) also overlapped with these results. Therefore, the evidence suggests that the real association between AUD and severe role impairment in South Africa is closer to the results reported for the international sample.

The fact that the associations between AUD and severe role impairment are generally weaker than other CMDs does not mean that alcohol abuse on campuses should be taken

lightly. There is ample evidence of hazardous drinking patterns, including binge drinking, on South African university campuses (Maphisa & Young, 2018; Peltzer, Malaka, & Phaswana, 2002; Tolken, 2011), which can have serious consequences, including deleterious effects on brain function and development (Cservenka and Brumback, 2017; Zeigler et al., 2005), and raising the risk of other CMDs (Fergusson, Boden, & Horwood, 2011). Alcohol use disorders also contribute to high risk behaviours such as unsafe sex (Scott-Sheldon et al., 2016), interpersonal violence (Graham & Livingston, 2011), suicidality (Brown et al., 2008), and traffic injuries (Taylor et al., 2010), all of which lead to injury and morbidity among youth.

Sociodemographic predictors of severe role impairment

In this study, certain student subgroups were found to be at increased risk of severe role impairment, independently of CMDs, including self-identified Black students, sexual minority students, and older first-generation students. According to Carlton (2015), there is an increasing number of programs to support underrepresented populations on university campuses, such as the groups above. These programmes are especially relevant in South Africa, where some of the mental health related disparities detected between groups may be due to the enduring social and economic legacy of apartheid. It would require further investigation to determine what causes the groups above to have higher rates of impairment on university campuses in South Africa, and to determine the appropriateness of using special interventions and outreach programmes to support these subgroups. Among researchers and policy-makers, disability is understood as an interaction between the health conditions that people have, and their physical, social and political environments (World Health Organisation, 2020a). Therefore, it would be particularly helpful if future investigations examined the interactions between the mental health of the student subgroups identified in this study, and the campus environment to look for causes of the elevated levels of role

impairment that were reported. Such an analysis may lend itself to contextually-sensitive solutions to improve the functioning of these students. The associations that were found between severe role impairment and selected sociodemographic factors are discussed below.

Population group

Self-identified Black students had higher odds of severe role impairment (in at least one of the categories that were assessed) compared to self-identified White students (aOR = 1.59). However, the result was not significant for any category of impairment in particular. This suggest that self-identified Black students generally reported more severe role impairment than self-identified White students.

The prevailing evidence in the literature suggests that findings concerning population group and mental health are due to social factors rather than biological factors. The reason for this is that associations between minority population groups and CMDs are contextually and culturally contingent (Bantjes et al., 2019; Eisenberg et al., 2013). If the associations between population group and CMDs were due to biological factors, the findings would not have been so inconsistent.

The fact that population group was found to predict severe role impairment in this study is scientifically interesting in light of the fact that Bantjes et al. (2019) did not find any significant associations between self-identified Black students and CMDs in the South African student sample. In fact, the associations between population group and CMDs, although not statistically significant, were consistently negative, indicating that self-identified Black students in the sample might even have slight resilience to CMDs. Therefore, taken together, the present study and the study by Bantjes et al. suggest that self-identified Black students were not more likely to suffer from CMDs than self-identified White students, but they were more likely to be severely impaired in important roles. Common mental disorders

were also controlled for in this analysis, which means that elevated levels of severe role impairment among self-identified Black students in South Africa must be due to reasons other than CMDs, such as mental disorders that were not assessed in the survey, social issues, or other issues that have an impact on their health-related functioning.

Minority sexual orientation

Minority sexual orientation was significantly associated with severe impairment in all of the categories that were assessed, except social life. Using male heterosexual students as the comparison group, lesbian students also experienced significantly higher levels of severe impairment in close relationships (aOR = 1.73), while no statistically significant results were found for either male sexual minorities or heterosexual females in the same comparison.

Sexual minority status is consistently associated with increased odds of CMDs both in the general population (Cochran, Sullivan, & Mays, 2003; Sandfort, de Graaf, Ten Have, Ransome, & Schnabel, 2014) and in the university student population (Auerbach et al., 2018; Bantjes et al., 2019; Eisenberg et al., 2013; Kerr, Santurri, & Peters, 2013). The 'minority stress' hypothesis is the prevailing theory used to explain this phenomenon. It is argued that mental health problems in sexual minorities are provoked by social prejudice and discrimination (Zietsch et al., 2012). This theory has a lot of evidence to support it (Arndt & Bruin, 2006; Cishe, Twaise, Goon, & Abaver, 2014; Mwaba, 2009; Winberg et al., 2019; Woodford, Kulick, & Atteberry, 2015; Woodford, Silverschanz, Swank, Scherrer, & Raiz, 2012; Worthen, 2018). There is also strong evidence that minority sexuality and CMDs share a common set of causes, including genetic factors, and environmental factors other than discrimination, such as child abuse (Sandfort et al., 2014; Zietsch et al., 2012). Between these evidence-based theories, the literature therefore supports possible explanations for the finding that sexual minority students in South Africa have increased odds of severe role impairment.

However, there is no evidence to explain why especially lesbian students have increased odds of severe impairment in close relationships.

Older first-generation students

Using non-first-generation students who were 21 years and older as the comparison group, first-generation students who were 21 years and older had significantly higher odds of severe role impairment, independently of CMDs (aOR = 3.01). This is not surprising, seeing that first-generation student status and older age are both associated with higher odds of 12-month CMDs in the literature (Andrews, Henderson, & Hall, 2001; Alonso et al., 2018; Auerbach et al., 2018; Covarrubias, Romero, & Trivelli, 2015; Eisenberg et al., 2007; Herman et al., 2009a; Kessler et al., 1994; McFadden, 2016; Stallman, 2010; Stebleton, Soria, & Huesman, 2014). One would therefore expect that older students would be more impaired than younger students, and older first-generation students would be particularly impaired. In the WMH-ICS, older first-year students were generally found to have higher rates of CMDs, and to be more impaired than younger students (Alonso et al., 2018; Bantjes et al., 2019), but first-generation student status was, anomalously, not a significant predictor of CMDs or severe role impairment on its own, including in the South African sample (Alonso et al., 2018; Bantjes et al., 2019). It is therefore interesting that first-generation student status was found to be an important predictor of severe social impairment in the present study, particularly among older students.

The data from the present study cannot be used to determine why older first-generation students in South Africa are at increased risk of severe social impairment. One can, however, speculate about the social pressures that these students face that they do not necessarily share with their peers. For instance, older first-generation students might find it difficult to fit in with the culture of predominantly younger students, which is a pressure they share with older

students in general. However, in addition, first-generation students may receive less guidance from their parents about how to navigate the university experience, because their parents did not go through the experience themselves (Stebleton et al., 2014). Furthermore, they may face more financial pressures than their peers, such as with financing their studies, seeing that educational level is strongly correlated with family income, and as first-generation students their parents are not university-educated (Stebleton et al., 2014). All of these factors may contribute to older first-generation students reporting more severe social impairment than their age-matched peers, independently of CMDs.

Limitations

The study is limited by the fact that it is exploratory, and was conducted at an early stage of the longitudinal WMH-ICS project in South Africa. The sample size, although considerable (n = 1 402), was therefore too small to detect associations between smaller student subgroups and severe role impairment.

Furthermore, in epidemiological studies such as the present study, it is highly problematic to move from observations to theories of causation (Wakeford & McElvenny, 2007). We can therefore say with certainty that CMDs are associated with severe role impairment, and that certain student subgroups have elevated levels of severe role impairment, independently of CMDs, but we cannot say exactly how CMDs cause impairment, or why some groups are at risk.

The application of the study findings to the general population is also limited by a number of sampling errors. First, there was selection error. Although all incoming first-year students at SUN and UCT were invited to participate in the WMH-ICS web-based survey, students self-selected to participate. This means that the golden standard of random sampling was not met to create a sample that is representative of the population (Frey, 2018). Second,

there was possible non-response bias, with the response rate in the study being 10.8%. Web-based surveys typically generate lower response rates than many other survey methods, such as paper surveys and telephone interviews, but the response rate in this study is nevertheless in the low range compared to the mean response rate of roughly 30% that is found for web-based surveys (Shih & Fan, 2009). A lower response rate does not necessarily have bearing on the representativeness of the sample, unless respondents and non-respondents differed from one another in ways that are relevant to the study findings (Cook et al., 2000). Nevertheless, the differences between respondents and nonrespondents in the present study are not known. Finally, there was sampling bias, with self-identified White and female students being oversampled. This is a systematic error, which is considered to occur in predictable ways. However, although the post-stratification weighting technique (Holt & Smith, 1979) was used to correct for sampling bias, it is still a weakness in the study.

The study is furthermore cross-sectional, which means data is collected from first-year students at a single point in time. We therefore get a snapshot of the mental health of first-year students at the time the measurements were made, but we do not observe how their mental health changes over time. Nevertheless, as the WMH-ICS initiative progresses, longitudinal data will become available for future studies.

Finally, there are limitations associated with the method that was used to measure role impairment in the study. These limitations can be teased out by comparing the methodologies that were used to measure role impairment in the WMH-ICS and the WMH Surveys. There is consensus that disability is caused by interactions between health conditions and the environment (World Health Organisation, 2020a). In the WMH Surveys, these interactions between CMDs and the environment were measured using the WHO-DAS, which was included in the WMH-CIDI survey instrument (Kessler & Üstün, 2004; World Health Organisation, 2018a). In the WMH-ICS, on the other hand, where only the SDS was used to

measure role impairment, the interactions between health conditions and the environment were not measured (Andrew C. Leon et al., 1997). Furthermore, the WMH-CIDI instructed research participants to rate the impairment associated with each CMD individually, whereas the WMH-ICS instrument instructed participants to provide a global rating of impairment due to both mental *and* physical health problems (Alonso et al., 2018). Both these methods have advantages and disadvantages. For instance, it is problematic that the WMH Surveys relied on research participants to tease out, and quantify, how much of their impairment is caused by each of their health conditions when they often had more than one disorder (Kessler & Üstün, 2004). This method does, however, make it relatively simple to compare the role impairment that participants assigned to individual CMDs. The WMH-ICS researchers, on the other hand, had to use statistical methods to tease out associations between CMDs and the global score of severe role impairment, which created various difficulties, such as overlapping confidence intervals, and the need for large sample sizes. The WMH-ICS researchers also run the risk of failing to control for confounding variables in their analyses of factors that are associated with severe role impairment. Nevertheless, the need for mental healthcare in the university population can be more accurately derived from the global impairment score that is used in the WMH-ICS than from the individual scores obtained in the WMH Surveys. The global impairment score makes the full extent of impairment in the university population visible, whereas the sum of the impairment associated with individual disorders would render impairment due to other mental health-related reasons invisible, including the impairment caused by CMDs that were not included in the survey instrument, and social factors. A global score of impairment is also needed to identify subgroups of students that are at increased risk of severe role impairment, independently of CMDs.

Conclusion

The need for mental healthcare among first-year students in South Africa was high, with roughly a quarter of students (25.7%) reporting severe role impairment. The online interventions that are planned in the WMH-ICS can be used to address the widespread need for mental healthcare on South African university campuses, even in the context of limited resources (Cuijpers et al., 2019a). The findings of this study can be used to plan and target interventions such as those planned in the WMH-ICS. Of students with 12-month CMDs (42.7%), 42.2% reported severe role impairment, which amounts to 18% of first-year students who need mental healthcare. The results showed that GAD, MDD and ADHD carried the largest proportion of the need for care when both prevalence and role impairment were taken into account, and therefore these disorders should be prioritised in intervention efforts with students who have 12-month CMDs. Furthermore, when estimating the need for care, it is important to take account of the 13.3% of students without 12-month CMDs who reported severe role impairment (7.6% of the total sample), seeing that some of these students may have disorders that were not included in the survey. It may furthermore be appropriate to use targeted outreach and special interventions to support groups of students who are at increased risk of severe role impairment independently of CMDs, including self-identified Black students, sexual minority students, and older first-generation students. The findings and implications of the study will be explored further in the next chapter.

Chapter 6: Conclusion

This study introduces the best information that we currently have on the need for mental healthcare on South African university campuses. Previous studies determined the prevalence of CMDs among university students in South Africa (Bantjes et al., 2019), but this is the first study to also examine role impairment in this population. Role impairment, and other raw measures of disability, provide us with the most comprehensive picture of the prevalence of health conditions in the university environment, seeing that selective diagnostic screening will inevitably miss some sources of health-related impairment. The results of this study show that more than a quarter of students reported severe role impairment due to health reasons (25.7%). Online mental health interventions such as those planned in the WMH-ICS have the potential to improve the functioning of a large number of these students in a cost-effective manner (Conley, Durlak, Shapiro, Kirsch, & Zahniser, 2016; Cuijpers et al., 2019a; Davies, Morriss, & Glazebrook, 2014; Harrer et al., 2019). Mental health statistics such as the prevalence of CMDs and role impairment are used to estimate the need for mental healthcare, and are therefore essential in the planning of services and interventions such as those offered in the WMH-ICS initiative (Kessler and Üstün, 2004). In this study, only students who were severely impaired by their disorders were deemed to be in need of mental healthcare. It was found that 42.7% of students had 12-month CMDs, of which more than two fifths were severely impaired (42.2%). This amounts to 18% of the total sample of first year students who had 12-month CMDs and reported severe role impairment, and therefore need mental healthcare. It is also important to plan for additional demand for services, as 13.3% of students who did not screen positive for 12-month CMDs nevertheless reported severe role impairment (7.6% of the total sample), some of whom may have mental disorders that were not included in the survey. The results showed that GAD, MDD and ADHD carried the largest proportion of the need for care when both prevalence and role impairment were

taken into account, which suggests that these disorders should be prioritised in intervention efforts with students who have 12-month CMDs. Some subgroups of students, such as sexual minority students, self-identified Black students, and older first-generation students, were more likely to report severe role impairment than their peers, independently of CMDs. These students can be supported with targeted outreach and special interventions, with a focus on promoting functioning.

This study has laid the groundwork for future studies of role impairment in the South African student population, and identifies some promising research gaps. For instance, there is a strong body of research to support why self-identified Black students, sexual minority students, and older first-generation students were found to have elevated rates of severe role impairment in this study (Bantjes et al., 2019; Eisenberg et al., 2013; Kessler et al., 1994; Stebleton, Soria, & Huesman, 2014). However, it is essential to determine the meaning of these associations in the social context in which they occurred, namely SUN and UCT. The biopsychosocial model of disability is the dominant explanation of disability among researchers and policy-makers, that describes disability as an interaction between health conditions and the physical, social and political environments (World Health Organisation, 2020a). This paradigm may be useful for gaining a better understanding of mental health-related impairment on South African university campuses, which may lead to contextually sensitive solutions to improve student functioning. It is also important to study potential sources of resilience in the many students who have 12-month CMDs but are not severely impaired by their disorders. This knowledge can be used to help severely impaired students with 12-month CMDs function better.

Interesting possibilities for studying role impairment will also be opened up as the WMH-ICS database is updated with longitudinal data. For instance, it may be interesting to investigate whether students' levels of impairment change over time, and what risk and

protective factors are involved in these changes. There are also opportunities for studying the associations between severe role impairment and suicidality, which is a major cause of death among youth (WHO, 2019). We know that CMDs and suicidality are strongly associated, but we do not know much about the associations between severe role impairment and suicidality. If such associations are found, it may be possible to use measures of role impairment in the context of suicide prevention.

South Africa has large social problems, such as inequality and joblessness, which is partly due to a lack of education (Statistics South Africa, 2019c). The democratic South African government has invested in higher education since 1994, and big strides have been made to redress social inequalities in access to higher education, but South African universities nevertheless deal with high rates of student attrition (Council on Higher Education, 1999; Council on Higher Education, 2019). The findings of this study show that a large proportion of first-year students report severe mental health-related impairment, including academic impairment, and students from previously disadvantaged groups, such as self-identified Black students and sexual minority students, are disproportionately affected. It is in the interest of both government and universities to invest in student mental health to improve the academic outcomes of students. For students, this support would come at a critical time when the rates of CMDs are at their highest (Kessler et al., 1994), and mental health interventions have the potential to directly affect their personal development and career trajectories.

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Appendix A

UNIVERSITEIT
STELLENBOSCH
UNIVERSITY

Progress Report
Approval Letter

19/02/2019

Project Reference #: 4213

Ethics Reference #: N13/10/149

Title: International Study on Student Health and Wellness

Dear Prof Dan Stein ,

Your request for extension/annual renewal of ethics approval dated 03/12/2018 14:11 refers.

The Health Research Ethics Committee reviewed and approved the annual progress report you submitted through an expedited review process.

The approval of this project is extended for a further year.

Approval date: 19 February 2019

Expiry date: 18 February 2020

Kindly be reminded to submit progress reports two (2) months before expiry date.

Where to submit any documentation

Kindly note that the HREC uses an electronic ethics review management system, *Infonetica*, to manage ethics applications and ethics review process. To submit any documentation to HREC, please click on the following link: https://applyethics.sun.ac.za.

Please remember to use your **Project ID** [4213] and Ethics Reference Number N13/10/149 on any documents or correspondence with the HREC concerning your research protocol.

Yours sincerely,

Mrs. Melody Shana,

Coordinator,

HREC1.

UNIVERSITY OF CAPE TOWN

HUMAN RESEARCH ETHICS COMMITTEE
26 APR 2019
HEALTH SCIENCES FACULTY
UNIVERSITY OF CAPE TOWN

FACULTY OF HEALTH SCIENCES
Human Research Ethics Committee

FHS016: Annual Progress Report / Renewal

HREC office use only (FWA00001637; IRB00001938) This serves as notification of annual approval, including any documentation described below.			
☑ Approved	Annual progress report	Approved until/next renewal date	30.06.2020
☐ Not approved	See attached comments		
Signature Chairperson of the HREC		Date Signed	27/4/2019

Comments to PI from the HREC

Principal Investigator to complete the following:

1. Protocol information

Date (when submitting this form)	16/04/2019		
HREC REF Number	744/2015	Current Ethics Approval was granted until	30/06/2019
Protocol title	International study on student health and wellness		
Protocol number (if applicable)	N/A		
Are there any sub-studies linked to this study?	☐ No		
If yes, could you please provide the HREC Ref's for all sub-studies? Note: A separate FHS016 must be submitted for each sub-study.			
Principal Investigator	Prof DJ Stein		
Department / Office Internal Mail Address	dan.stein@uct.ac.za		

1.1 Does this protocol receive US Federal funding?	☐ Yes	✓ No
1.2 If the study receives US Federal Funding, does the annual report require full committee approval?	☐ Yes	N/A
1.3 Has sponsorship of this study changed? If yes, please attach a revised summary of the budget.	☐ Yes	✓ No

Appendix B

UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvennoot • your knowledge partner

INSTITUTIONAL PERMISSION:

AGREEMENT ON USE OF PERSONAL INFORMATION IN RESEARCH

Name of Researcher: **Prof Dan Stein**

Name of Research Project: ***International Study on Student Health and Wellness***

Service Desk ID: **IRPSD_428**

Date of Issue: **15 May 2017**

Institutional permission for the continuance of this study is granted. You have permission to include a new cohort of first year students in 2017 to this project. You have permission to proceed with this project as stipulated in the institutional permission application and within the conditions set out in this agreement.

1 WHAT THIS AGREEMENT IS ABOUT	
What is POPI?	1.1 POPI is the Protection of Personal Information Act 4 of 2013. 1.2 POPI regulates the entire information life cycle from collection, through use and storage and even the destruction of personal information.
Why is this important to us?	1.3 Even though POPI is important, it is not the primary motivation for this agreement. The privacy of our students and employees are important to us. We want to ensure that no research project poses any risks to their privacy. 1.4 However, you are required to familiarise yourself with, and comply with POPI in its entirety.
What is considered to be personal information?	1.5 'Personal information' means information relating to an identifiable, living, individual or company, including, but not limited to: 1.5.1 information relating to the race, gender, sex, pregnancy, marital status, national, ethnic or social origin, colour, sexual orientation, age, physical or mental health, well-being, disability, religion, conscience, belief, culture, language and birth of the person; 1.5.2 information relating to the education or the medical, financial, criminal or employment history of the person;

Appendix C

Stellenbosch

CARING UNIVERSITIES STUDENT HEALTH SURVEY
FIRST YEAR STUDENTS

We appreciate your thoughtful and honest responses to the survey.
All responses you provide are confidential.

During the university years, you enter a key developmental period in which you may experience increased risk for academic, behavioral (e.g., alcohol/substance use, violence), and emotional problems (e.g., suicide), far greater than in any other period of life. Although in many universities treatment and referral services are available, not many students access these. Also, although there is scientific knowledge of current risk factors for each of these negative outcomes, there is a lack of any evidence-based method for using this knowledge to identify those at risk and refer them to appropriate services.

You are being invited to take part in a research study which aims to examine health, mental health and wellness behaviours of university students. All Stellenbosch University students who are entering university for the first time have been invited to participate. If you choose to participate, you will be e-mailed and asked to complete an electronic survey at the start of each academic year over four years.

You will also be asked for permission to link your responses to your academic record (academic year average, number of credits, leaves of absence, attrition/drop-out and disciplinary action).The idea is to study the association between health, mental health and wellness behaviours and academic performance. You can participate in the study even if you decline to have your academic information linked to your survey responses.

Although taking part in this study may not benefit you directly, it will provide information on risk factors for mental health, academic and behavioural problems. There are no expected serious risks of taking part in this research. You may however feel tired or inconvenienced by the survey. This is likely to be minimal as the survey should take approximately 30 minutes to complete and can be done at a time that is convenient to you. You are also not obliged to answer any question you may find upsetting or inappropriate to you, and not answering any questions will not count against you in any way, and that you may withdraw from the study at any time without giving a reason. As noted earlier, you may leave and return to the survey at any time (to be completed within 4 weeks' time). Your answers will be saved.

Your participation is entirely voluntary and you are free to decline to participate in all or part of the survey. If you say no, this will not affect you negatively, even if you initially agreed to participate. You also do not have to answer any questions you do not have to. Should you wish to withdraw from the study, you may contact one of the study investigators (contact information below) and request that their information be removed. Reminders will be sent students who did not indicate that they either accept or decline participation (non-responders) at week 1, 2 and 3 after the study commences.

Your responses will not be part of your own personal medical or mental health record.

Only the principle investigator (Prof Dan Stein) and local researchers that are directly involved with the project (i.e. Janine Roos, Prof Christine Lochner and their respective research assistants) will have access to your student number and student e-mail address. This is necessary so that participants can be sent the follow-up surveys in their upcoming years of study. Once the data collections have been completed in your final year of study, your student e-mail address will be deleted from our database. All participants will be allocated a unique study code on the electronic database which will be used during the data analysis stages. If the data are used in a publication, your identity will remain secret. The researchers will keep any information they collect on password-protected computers at all times.

Participating in this study will not cost you any money. However, at the end of each year of the study, fifty students who complete the e-survey will be entered into a lucky-draw to win a R100 gift voucher (e.g Exclusive Books, TakeAlot.com or Loot).

This study has been approved by the Human Research Ethics Committee (HREC) at Stellenbosch University and will be conducted according to the ethical guidelines and principles of the South African Department of Health's Ethics in Health Research. This study is led by Prof Dan Stein who is affiliated with the Medical Research Council Unit on Risk & Resilience in Mental Disorders, Universities of Stellenbosch and Cape Town. His contact details are: (021) 406-6566 or dan.stein@uct.ac.za

- You can contact Mrs Janine Roos of the Mental Health Information Centre of SA at 021-938-9229 or jroos@sun.ac.za if you have any further queries or encounter any problems.

- You can contact the Health Research Ethics Committee at 021 938 9819 if you have any concerns or complaints that have not been adequately addressed.

- You may print a copy of this information form for your own records.

UCT

CARING UNIVERSITIES STUDENT HEALTH SURVEY FIRST YEAR STUDENTS

We appreciate your thoughtful and honest responses to the survey.
All responses you provide are confidential.

During the university years, you enter a key developmental period in which you may experience increased risk for academic, behavioral (e.g., alcohol/substance use, violence), and emotional problems (e.g., suicide), far greater than in any other period of life. Although in many universities treatment and referral services are available, not many students access these. Also, although there is scientific knowledge of current risk factors for each of these negative outcomes, there is a lack of any evidence-based method for using this knowledge to identify those at risk and refer them to appropriate services.

You are being invited to take part in a research study which aims to examine health, mental health and wellness behaviours of university students. All UCT students who are entering university for the first time have been invited to participate. If you choose to participate, you will be e-mailed and asked to complete an electronic survey at the start of each academic year over four years.

You will also be asked for permission to link your responses to your academic record (academic year average, number of credits, leaves of absence, attrition/drop-out and disciplinary action).The idea is to study the association between health, mental health and wellness behaviours and academic performance. You can participate in the study even if you decline to have your academic information linked to your survey responses.

Although taking part in this study may not benefit you directly, it will provide information on risk factors for mental health, academic and behavioural problems. There are no expected serious risks of taking part in this research. You may however feel tired or inconvenienced by the survey. This is likely to be minimal as the survey should take approximately 30 minutes to complete and can be done at a time that is convenient to you. You are also not obliged to answer any question you may find upsetting or inappropriate to you, and not answering any questions will not count against you in any way, and that you may withdraw from the study at any time without giving a reason. As noted earlier, you may leave and return to the survey at any time (to be completed within 4 weeks' time). Your answers will be saved.

Your participation is entirely voluntary and you are free to decline to participate in all or part of the survey. If you say no, this will not affect you negatively, even if you initially agreed to participate. You also do not have to answer any questions you do not have to. Should you wish to withdraw from the study, you may contact one of the study investigators (contact information below) and request that their information be removed. Reminders will be sent

students who did not indicate that they either accept or decline participation (non-responders) at week 1, 2 and 3 after the study commences.

Your responses will not be part of your own personal medical or mental health record.

Only the principle investigator (Prof Dan Stein) and local researchers that are directly involved with the project (i.e. Janine Roos, Prof Christine Lochner and their respective research assistants) will have access to your student number and student e-mail address. This is necessary so that participants can be sent the follow-up surveys in their upcoming years of study. Once the data collections have been completed in your final year of study, your student e-mail address will be deleted from our database. All participants will be allocated a unique study code on the electronic database which will be used during the data analysis stages. If the data are used in a publication, your identity will remain secret. The researchers will keep any information they collect on password-protected computers at all times.

Participating in this study will not cost you any money. However, at the end of each year of the study, fifty students who complete the e-survey will be entered into a lucky-draw to win a R100 gift voucher (e.g Exclusive Books, TakeAlot.com or Loot).

This study has been approved by the Human Research Ethics Committee (HREC) at University of Cape Town and will be conducted according to the ethical guidelines and principles of the South African Department of Health's Ethics in Health Research. This study is led by Prof Dan Stein who is affiliated with the Medical Research Council Unit on Risk & Resilience in Mental Disorders, Universities of Stellenbosch and Cape Town. His contact details are: (021) 406-6566 or dan.stein@uct.ac.za

- You can contact Mrs Janine Roos of the Mental Health Information Centre of SA at 021-938-9229 or jroos@sun.ac.za if you have any further queries or encounter any problems.

- You can contact the Health Research Ethics Committee at 021 406 6346 if you have any concerns or complaints that have not been adequately addressed.

- You may print a copy of this information form for your own records.

Appendix D

Table 25: Interactions between sociodemographic predictors of severe role impairment

	Predictor distribution (95%CI)	**Any severe role impairment aOR (95%CI)**	**Home management aOR (95%CI)**	**University-related work aOR (95%CI)**	**Close relationships aOR (95%CI)**	**Social Life aOR (95%CI)**
Gender (self-identified female)	55.2% (52.6-57.8)	0.96 (0.36-2.51)	0.40 (0.08-2.14)	1.42 (0.42-4.77)	0.85 (0.27-2.64)	0.90 (0.25-3.27)
Population group (self-identified Black)	41.4% (38.8-44.0)	1.04 (0.38-2.88)	0.18 (0.02-1.57)	0.67 (0.18-2.47)	1.47 (0.45-4.85)	1.78 (0.47-6.81)
Age (under 21 years)	92.3% (90.8-93.6)	0.48 (0.20-1.18)	0.20* (0.04-0.90)	0.40 (0.13-1.26)	0.65 (0.22-1.94)	0.79 (0.22-2.77)
First generation students	19.7% (17.7-21.9)	2.34 (0.64-8.52)	2.58 (0.20-33.61)	1.79 (0.34-9.45)	2.47 (0.57-10.81)	14.89** (31.82-69.67)
Minority sexual orientation	22.2% (20.1-24.5)	2.21 (0.67-7.30)	0.52 (0.05-5.03)	2.26 (0.53-9.73)	1.30 (0.32-5.34)	0.51 (0.10-2.58)
Disability	18.4%	1.4	0.45	-	2.25	1.26

	(16.4-20.5)	(0.38-5.13)	(0.03-6.27)	-	(0.54-9.38)	(0.24-6.61)
Gender X Population group (self-identified Black)	24.0% (21.8-26.3)	0.58 (0.33-1.01)	1.19 (0.43-3.32)	1.21 (0.56-2.65)	0.71 (0.36-1.40)	0.64 (0.32-1.29)
Gender X Age	51.7% (49.1-54.4)	1.56 (0.61-4.00)	2.63 (0.49-14.10)	0.85 (2.26-2.85)	1.63 (0.55-4.88)	2.00 (0.59-6.81)
Gender X First-generation student	10.3% (8.8-12.0)	0.83 (0.43-1.59)	0.49 (0.16-1.52)	0.99 (0.40-2.46)	0.66 (0.30-1.43)	0.88 (0.39-1.98)
Gender X Minority sexual orientation	11.7% (10.1-13.5)	1.38 (0.76-2.51)	1.17 (0.44-3.07)	0.74 (0.33-1.64)	2.45* (1.18-5.08)	1.58 (0.73-3.40)
Gender X Disability	12.8% (10.1-13.5)	0.81 (0.40-1.62)	0.77 (0.24-2.52)	1.17 (0.43-3.21)	1.03 (0.42-2.48)	0.88 (0.37-2.08)
Population group (self-identified Black) X Age	37.3% (34.8-39.9)	2.02 (0.75-5.48)	6.09 (0.77-48.51)	1.83 (0.53-6.35)	1.05 (0.33-3.34)	0.98 (0.27-3.55)
	14.6%	0.86	5.80*	0.87	1.03	0.50

Population group (self-identified Black) X First-generation students	(12.8-16.6)	(0.43-1.73)	(1.26-26.65)	(0.33-2.32)	(0.45-2.36)	(0.22-1.15)
Population group (self-identified Black) X Minority sexual orientation	12.2% (10.5-14.0)	1 (0.54-1.85)	0.50 (0.16-1.59)	1.54 (0.68-3.47)	0.97 (0.47-2.00)	1.61 (0.76-3.41)
Population group (self-identified Black) X Disability	7.6% (6.8-9.1)	1.06 (0.53-2.10)	1.02 (0.29-3.57)	0.70 (0.27-1.83)	1.29 (0.56-2.96)	0.95 (0.42-2.16)
Age X First-generation students	17.2% (10.5-14.0)	0.75 (0.23-2.42)	0.17 (0.01-2.12)	0.80 (0.18-3.54)	0.93 (0.25-3.47)	0.19* (0.05-0.79)
Age X Minority sexual orientation	20.0% (17.9-22.2)	0.73 (0.23-2.31)	4.78 (0.48-47.21)	0.93 (0.22-3.88)	0.93 (0.24-3.53)	1.97 (0.44-8.84)
	17.1%	1.32	2.98	-	0.51	1.39

Age X Disability	(15.2-19.2)	(0.37-4.67)	(0.21-42.63)	-	(0.13-1.98)	(0.28-6.90)
First-generation students X Sexual orientation	9.0% (7.6-10.6)	0.86 (0.44-1.69)	1.15 (0.36-3.74)	0.62 (0.25-1.53)	0.49 (0.22-1.10)	0.50 (0.21-1.15)
First-generation students X Disability	4.1% (3.1-5.3)	0.6 (0.27-1.37)	0.68 (0.17-2.80)	0.47 (0.13-1.62)	0.52 (0.19-1.41)	0.37 (0.13-1.03)
Minority sexual orientation X Disability	3.9% (2.9-5.1)	0.86 (0.41-1.83)	1.14 (0.33-3.88)	0.79 (0.29-2.19)	0.81 (0.33-1.97)	1.56 (0.65-3.73)
		R^2= 0.063 X^2 (21) = 59.367 p = 0.000	R^2= 0.063 X^2 (21) = 26.332 p = 0.194	R^2=.053 X^2(21) = 37.191 p=0.016	R^2= 0.049 X^2 (21) = 39.13 (p = 0.01)*	R^2= 0.061 X^2 (21) = 47.49 (p = 0.00)*

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* $p<0.05$

**$p<0.01$

Appendix E

Table 26: Multiple regression analysis of sociodemographic factors associated with severe impairment in home management, including all main and 2X2 interaction effects (n=696)

	Predictor distribution % (95%CI)	**Home management aOR (95%CI) aOR (95% CI)**
Gender (self-identified female)	55.2% (52.6-57.8)	0.88 (0.58-1.34)
Population group (self-identified Black)	41.4% (38.8-44.0)	0.97 (0.57-1.62)
Age (under 21 years)	92.3% (90.8-93.6)	0.81 (0.40-1.63)
First generation students	19.7% (17.7-21.9)	0.54 (0.17-1.67)
Minority sexual orientation	22.2% (20.1-24.5)	1.74* (1.09-2.77)
Disability	18.4% (16.4-20.5)	1.05 (0.63-1.74)
First generation students X Population group (self-identified Black)	14.6% (12.8-16.6)	3.06 (0.88-10.65)

		R^2= 0.040
		X^2 (7) = 16.39
		(p = 0.00)

aOR: adjusted odds ratios
95%CI: 95% confidence interval
* p<0.05
**p<0.01

Table 27: Multiple regression analysis of sociodemographic factors associated with severe impairment in home management, including all main and 2X2 interaction effects (n=696)

	Predictor distribution (95%CI)	**Home management aOR (95% CI)**
Minority sexual orientation	22.2% (20.1-24.5)	1.75* 91.10-2.79)
Self-identified White first-generation students	5.1% (4.0-6.4)	0.55 (0.18-1.72)
Self-identified Black first-generation students	14.6% (12.8-16.6)	1.63 (0.96-2.74)
Self-identified Black non-first generation students	26.8% (24.5-29.2)	0.96 (0.57-1.61
Self-identified White non-first generation students	53.6% (51.0-56.2)	-
		R^2= 0.038
		X^2 (4) = 15.63

(p = 0.00)

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aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

**p<0.01

Appendix F

Table 28: Multiple regression analysis of sociodemographic factors associated with severe impairment in close relationships, including all main and 2X2 interaction effects (n=1 371)

	Predictor distribution % (95%CI)	**Close relationships aOR (95%CI)**
Gender (self-identified female)	55.2% (52.6-57.8)	1.07 (0.75-1.53)
Population group (self-identified Black)	41.4% (38.8-44.0)	1.33 (0.97-1.83)
Age (under 21 years)	92.3% (90.8-93.6)	0.71 (0.43-1.18)
First-generation students	19.7% (17.7-21.9)	1.25 (0.85-1.83)
Minority sexual orientation	22.2% (20.1-24.5)	1.04 (0.60-1.80)
Disability	18.4% (16.4-20.5)	1.15 (0.79-1.67)
Gender x Minority sexual orientation	11.7% (10.1-13.5)	2.02* (1.02-3.40
		R^2= 0.034

	X^2 (7) = 27.05
	(p = 0.00)

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

**p<0.01

Table 29: Multiple regression analysis of sociodemographic factors associated with severe impairment in close relationships, including all main and 2X2 interaction effects (n=1 371)

	Predictor distribution % (95%CI)	**Close relationships aOR (95%CI)**
Male minority sexual orientation	10.5% (8.94-12.2)	1.20 (0.70-2.04)
Female minority sexual orientation	11.7% (10.1-13.5)	2.52** (1.63-3.90)
Female minority sexual orientation	43.5% (40.9-46.1)	1.09 (0.77-1.56)
Male minority sexual orientation	34.3% (31.8-36.9)	-
		R^2= 0.023
		X^2 (3) = 17.97
		(p = 0.00)

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

**p<0.01

Appendix G

Table 30: Multiple regression analysis of sociodemographic factors associated with severe impairment in social life, including all main and 2X2 interaction effects (n=1371)

	Predictor distribution % (95%CI)	**Social life aOR (95%CI)**
Gender (self-identified female)	55.2% (52.6-57.8)	1.52* (1.10-2.10)
Population group (self-identified Black)	41.4% (38.8-44.0)	1.3 (0.94-1.81)
Age (under 21 years)	92.3% (90.8-93.6)	1.26 (0.57-2.77)
First-generation students	19.7% (17.7-21.9)	3.53* (1.22-10.26)
Minority sexual orientation	22.2% (20.1-24.5)	1.51* (1.05-2.16)
Disability	18.4% (16.4-20.5)	1.43 (0.99-2.07)
First-generation students X Age (under 21)	17.2% (10.5-14.0)	0.29* (0.09-0.88)
		R^2= 0.041
		X^2 (7) = 31.35

		(p = 0.00)

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* p<0.05

**p<0.01

Table 31: Multiple regression analysis of sociodemographic factors associated with severe impairment in social life, including all main and 2X2 interaction effects (n=1371)

	Predictor distribution % (95%CI)	**Social life aOR (95%CI)**
Gender (self-identified female)	55.2% (52.6-57.8)	1.60** (1.17-2.20)
Minority sexual orientation	22.2% (20.1-24.5)	1.52* (1.06-2.18)
First generation students 21 and over	2.5% (1.75-3.46)	4.04* (1.40-11.67)
First-generation students under 21	17.2% (15.3-19.3)	1.44 (0.61-3.36)
Non-first generation students under 21	75.1% (72.6-77.3)	1.27 (0.58-2.78)
Non-first generation students 21 and over	5.2% (4.1-6.5)	- -
		R^2= 0.033
		X^2 (5) = 25.38
		(p = 0.00)

aOR: adjusted odds ratios

95%CI: 95% confidence interval

* $p<0.05$

** $p<0.01$